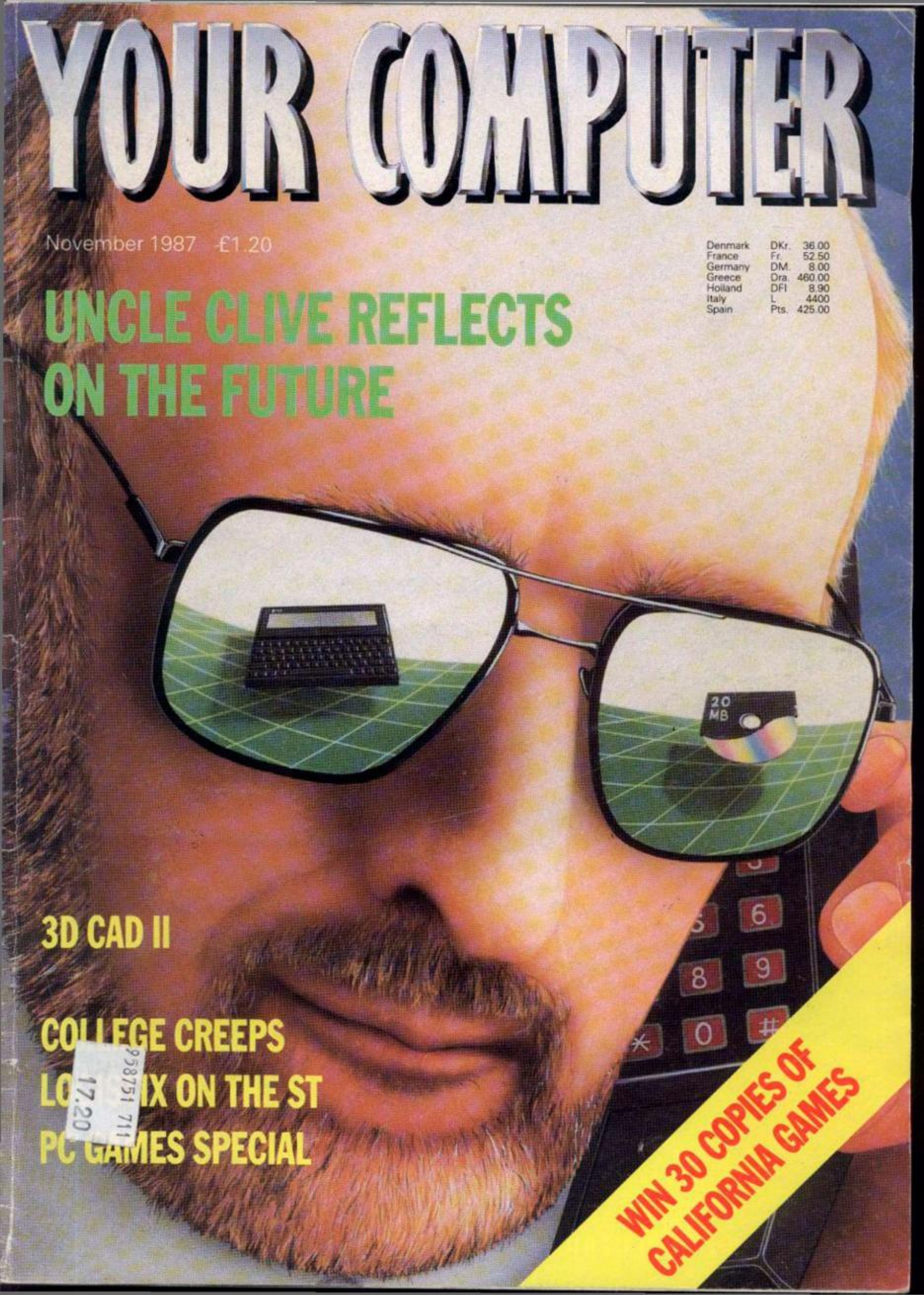
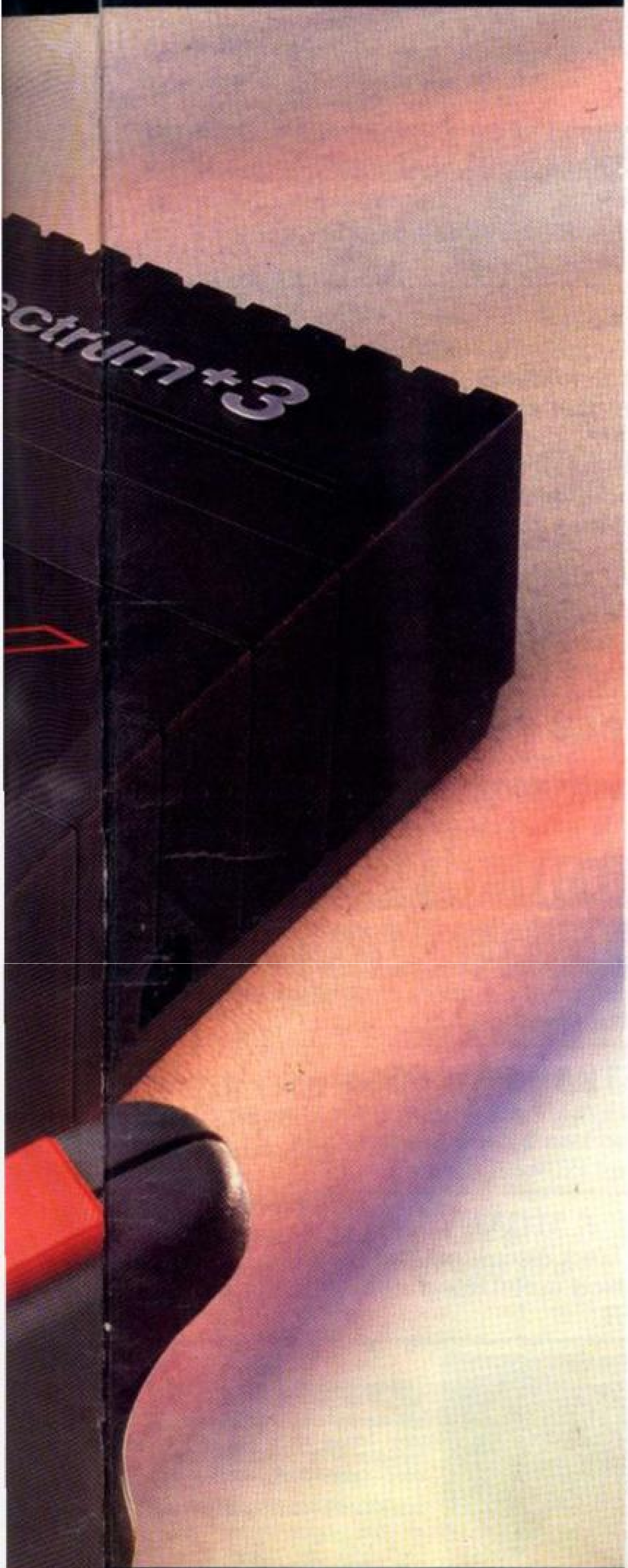

YOUR COMPUTER
November 1987 £1.20
Denmark DKr. 36.00
France Fr. 52.50
Germany DM. 8.00
Greece Dra. 460.00
Holland DFl 8.90
Italy L. 4400
Spain Pts. 425.00
UNCLE CLIVE REFLECTS ON THE FUTURE
20 MB
3D CAD II
COLLEGE CREEPS
LO IX ON THE ST
PC GAMES SPECIAL
WIN 30 COPIES OF CALIFORNIA GAMES

THE NEW SINCLAIR HAS ONE BIG DISK- AD



THE SINCLAIR ZX SPECTRUM + 3 WITH 6 FREE GAMES AND A JOYSTICK.

K- ADVANTAGE.



ZX SPECTRUM +3. £199



The new Sinclair ZX Spectrum +3 is a real hero – because it helps you to be one.

While you're a daring motorbike rider or the all-conquering intergalactic warrior, you're gaining priceless experience in handling computers.

Loading games is quick and easy with the built-in disk-drive. You'll be in the thick of the action in seconds. And the fantastic 128K memory gives you the power to outsmart the most sophisticated enemy.

Get to grips with the latest high-tec graphics on the vast universe of games available (six of which come free). And there's a free joystick to give you ultimate control.

But the real hero is the person who buys it. For the ZX Spectrum +3 is only £199, so they've really saved the earth.

ZX SPECTRUM +2. £139



The amazing ZX Spectrum +2 has a built-in datacorder – to save you the bother of tape recorders and leads. The advanced 128K memory helps you get the most from the vast universe of games available.

Every model comes complete with six free games to start you off, and a free joystick to make you super agile.

With the advanced Sinclair technology you can afford to let your imagination go wild. Because at £139, only your enemies pay heavily.

BE WHO YOU WANT TO BE.

Available at: Allders, Boots, Clydesdale, Comet, Connect, Currys, Dixons, John Lewis, John Menzies, Lasky's, Tandy,* W.H. Smith, Visionhire, Wigfalls, and all good independent stores.

*ZX Spectrum +2 only.

Recommended retail price Sinclair ZX Spectrum +2 £139 including VAT, Sinclair Spectrum +3 £199 including VAT at 1.10.87. Prices subject to change without prior notice.

Please tell me more about the SINCLAIR ZX Spectrum +2 ☐ ZX Spectrum +3 ☐

Name__________

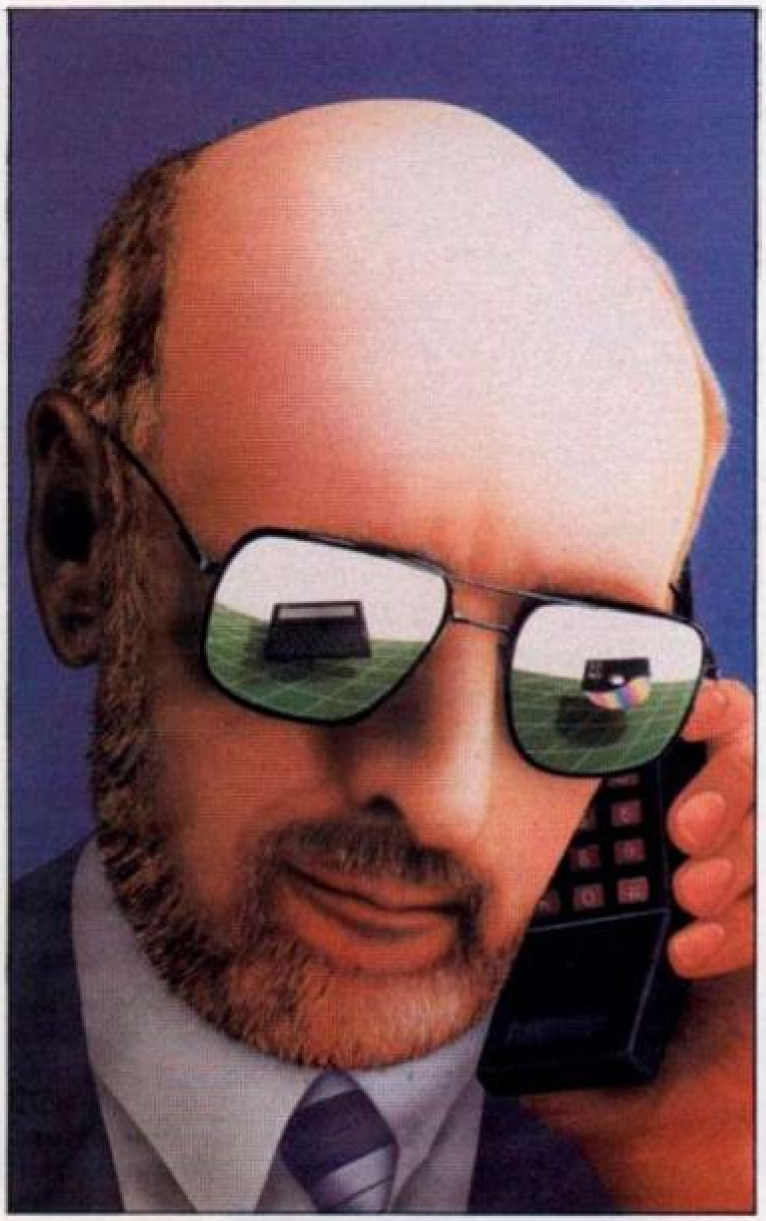
Address__________

ICK. sinclair

Amstrad plc, Brentwood House, 169 Kings Road, Brentwood, Essex CM14 4EF. Tel: (0277) 262326

contents

NOVEMBER 1987



COVER FEATURE

REGULARS

HOME OFFICE

Your Computer,
Greencoat House,
Francis Street,
LONDON SW1P 1DG
TELEPHONE: 01-834 1717
FAX: 01-828 0270
TELEX: 9419564 FOCUSG

ISSN 0263 0885

Printed by Cradley Print, England.
Typeset by Time Graphics Ltd., Northampton.

Distributed by Quadrant Publishing Services, Quadrant House, Surrey, SM2 5AS. Telephone 01-661 3239.

Subscriptions: U.K. £15 for 12 issues, Overseas (surface mail) £30 – airmail rates on request. Please make cheques/postal orders payable to Focus Magazines (allow 5 weeks from receipt of order to delivery of first subscription copy). Send orders to Your Computer Subscriptions, T.I.L., P.O. Box 74, Tonbridge, Kent TN12 6BW.

Back issues of the magazine from January 1986 onwards are available for £2.00 (U.K.), £3 (Overseas) from the Back Issues Department, Greencoat House, Francis Street, London SW1P 1DG.

FEATURES

SOFTWARE TOOLS

NEXT MONTH

A special hardware guide for the run-up to Christmas is the central feature in the December issue of *Your Computer*. Among the reviews is the first database for the Acorn Archimedes. Plus the usual news, Home Office and Software Toolkit supplements. On sale 12th November.



COMMENT

It's official: Sir Clive Sinclair is back. After being put in the shade by Alan Sugar's emergence as the British computer entrepreneur, Sir Clive has returned to the market with a new company, Cambridge Computer, and a new product, the Z88 portable. As usual, there is good news and bad news. The good news is that the Z88 appears to be a serviceable and useful product that should attract a lot of buyers.

The bad news, though, is that Sir Clive still seems to devote as much time to exciting but nebulous visions of the future as he does to the nitty-gritty of such matters as product delivery and performance. Sinclair's visionary zeal makes for good copy but will it cut any ice in the increasingly sophisticated and competitive micro market?

FOCUS MAGAZINES

Editor
Simon Craven
Staff Writer
Amon Cohen
Sub Editor
Harold Mayes MBE
Production Manager
Nick Fry
Copy Controller
Serena Hadley
Design
Chris Winch
Neil Tookey
Art Editor
Jim McClure
Advertisement Manager
Kathy McLennan
Senior Sales Executive
Ian Faux
Editorial Secretary
Sheila Baker
Managing Editor
Brendon Gore
Group Advertisement Manager
Alan Alcock
Marketing Manager
Jeremy Kite
Publisher
Trish Phillips
Group Publisher
Paul Coster

Financial Director
Brendan McGrath
Chief Executive
Richard Hease

Front Cover
by Tom Steyer

YOUR COMPUTER NEWS

Amstrad drops price of PC1512 by £50

Amstrad has capped a year of musical prices by cutting the PC1512 back to its launch price of £399 excluding VAT for the entry level model. At the same time it has discontinued the 20MB version of the machine. If you've an eye for a bargain, try Dixons, currently selling the 20MB colour 1512 for £999 excluding VAT.

The changes were due to take place on 23 September, and alongside them Amstrad started bundling Ability, Migent's low cost integrated software package, and four US Gold games with the machine. The final plank to the Amstrad Christmas pack appears (unless the 80386 prototype is wheeled out at the last minute) to be an extremely large (£7.5 million) advertising spend designed to make you, the customer, believe it all makes sense.

To an extent, it does. Amstrad has had a number of problems, both nice and nasty, over the past year. Discovering that the market wanted a lot more hard disk machines than had originally been thought was a nice one (everybody likes to be able to say they just can't make enough of a given product) while trying to balance the older 1512 against the new 1640 was a nastier one. The 1512 was launched without the capability to use IBM's Enhanced Graphics Adaptor (EGA) standard because Amstrad felt the market didn't want EGA.

The 1640, which has built-in EGA, was the realisation that the market did actually want it, but its spec is close to the 1512's, and the price wasn't that different.

Cutting the 1512 price helps put distance between the two, and downplaying hard disk versions of the 1512 helps some more (although you can still put a cheap hardcard into the floppy version).

The bundling of Ability is also significant, because here we could be seeing the 1512 evolving into a 'plug in and go' system which could take over the market that Amstrad PCWs currently occupy. A year ago Amstrad deliberately avoided this approach with the 1512 precisely because the company didn't want to compete with itself. The new PCW meanwhile, the 9512, is being priced at £499 while the 8256 drops to £299. Down and then out?

Old Epsons

If someone offers you an Epson LQ800 or an LQ1000 make sure you get a good-sized discount, because both machines are headed for the knacker's yard. Epson is to put out new machines, the LQ850 and LQ1050, at the same price later this year, at the same price as the old models.

The major difference appears to be in paper handling, which is more efficient on the new models, but there's just bound to be someone out there with a warehouse full of the old variety . . .

● **Going out . . . the Epson LX800 and LX1000.**





Tandy 386 machine for less than £2000

While other manufacturers are throwing up their hands in horror at plunging prices Tandy seems to be positively revelling in them. It has joined the throng in launching a sub-£2000 386 machine and has put out a high-specification laptop and a 286 machine for £995 and £895 respectively.

The laptop, the Tandy 1400, has 768K Ram, high contrast LCD screen and twin 3½in. disk drives, and is of course PC compatible, while the 286 machine, the 1000TX, has 640K Ram and should give Amstrad pause for thought. The icing on the cake, a £1795 laser printer, makes Tandy start to look like a low-cost supplier of desktop publishing hardware . . .

Wild Bill goes to work

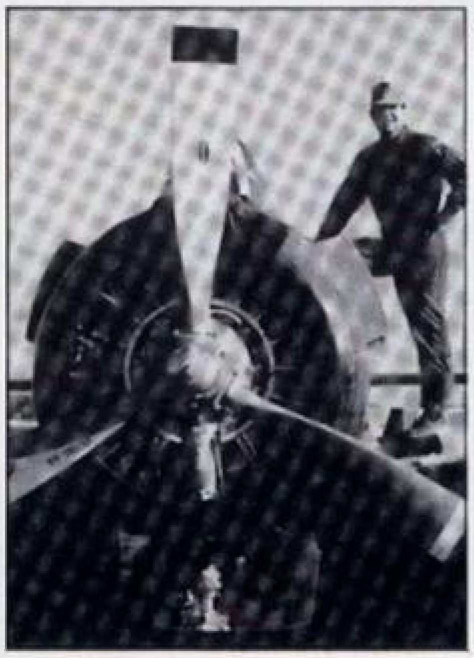
Games software companies are big business across the Atlantic. Aspiring British executives would do well to forsake the home country in search of the classier perks offered by US employers.

Forget the company Ferrari, chaps, what about the company aeroplane? In a 3000-mile-wide country with a 55 m.p.h. speed limit, it even makes sound business sense.

Followers of "Wild Bill" Stealy, the gung-ho president of Microprose will not be surprised that his company aeroplane is rather less of a capitalist tool than the corporate norm would dictate. Swift, comfortable, capacious and economical are just four adjectives completely inapplicable to the T-28 Trojan you see here.

Designed to turn snivelling 17-year-old creeps into rugged steely-eyed US Navy fighter pilots, its new role is to "lend support to the sales and marketing departments", according to Stealy. Reps for rival outfits are reported to be "concerned" about the prospect of Wild Bill calling down a napalm strike as they attempt to close a deal.





● **"Wild Bill" Stealy – when is the crash?**



Meanwhile YC's flight simulation correspondent Irvin Jaquette is dimissing rumours that Electronic Arts has approached him with a lucrative mercenary deal to provide top cover for their operations in his Tiger Moth.

Ms Microprose, as the beast has been dubbed, is scheduled to appear in the UK later this year, though an embarassing spate of engine failures has thrown this into doubt. Perhaps the Major will consider using a BMX Bandit in the future?

Atari remains cagey about Transputer

Atari's launch plans are acquiring a certain complexity. The company is strenuously denying that it is definitely launching a machine based on the Transputer (the British wonder-chip brought to you with the aid of Tony Benn and the National Enterprise Board) but it is confirming that a software house called Perihelion is working on a feasibility study for it. Meanwhile Perihelion Software (some relation) has acquired a £100,000 grant from the Department of Trade and Industry to develop an operating system for the Transputer.

A prototype machine is due next spring, at which point Atari will decide whether or not to go ahead – Atari being Atari, this will depend on the price being reasonable. If Atari does go for it, the gameplan goes something like this. The company produces a first generation machine which can be presented as an upgrade to the ST. As people develop for the new machine, the ST part, like the tail of a tadpole, slowly drops off, leaving scope for the second generation, the ST replacement.

Atari's PR people seem unnaturally worried about people writing about this, thinking it's going to stop them buying STs, but this should only exercise the brains of complete dingbats. With a prototype in 1987 we're looking for shipments in 1988 and we could easily be into 1990 before the new machine comes down to an affordable price.

● **The Kuma Max, one of the two products in existence which contains a transputer.**



Not quite so far into the realms of cloud cuckooland is the Atari 386 machine. Atari's PC series is now going straight from 8086 to 80386, skipping the 80286 originally planned for this autumn. The 386 box is due for launch at the Hanover fair next spring, and the way prices are going it will have to hit £1,000 if they want anyone to notice.

The ST meanwhile has plumbed new price depths with a W H Smith bundling deal, which slings six eminently playable games, including Arkanoid and Leaderboard, in with a £299 STFM. Smith's says the games are worth £200; they're certainly worth more than the time-expired tat you normally get in this kind of deal.

NEW AMIG
NOW OTHER HOME COMP

Amiga 500 is here.

With a mind-blowing array of features and capabilities.

And a £499‡ price ticket (inc. VAT), hundreds of pounds less than anyone could have predicted.

"...a miracle of compression..." writes *Popular Computing Weekly** "...it all adds up to a formidable system which is clearly better than anything else at the price."

This elegant little machine takes family computing into new dimensions of creativity, excitement and productivity.

It outruns and outguns office PCs as a business multi-tasker, performing a deskful of different jobs simultaneously, at over 7 million steps per second in realtime.

So other home computers may not be the only machines it consigns to the toy cupboard.



AMAZING SCIENCE FACT!

Amiga is used by Disney, Universal and other Hollywood studios for its dazzling 3D graphics manipulation and animation powers.

A sophisticated high-speed graphics processor called a blitter chip transforms images in realtime.

You can paint the screen with more than 4,000 colours. Create and modify designs and effects as you like, with pin-sharp resolution.

You command an almost limitless workshopful of stunning professional graphics capabilities.

With an optional Genlock interface, you can capture images off videotape. Manipulate and mix them with graphics. Then re-transfer them to videotape!

This means you can produce spectacular special effects like those created by Amiga computers for Channel 4's *Chart Show* and the American TV science fiction series *Amazing Stories.*

YOU AIN'T HEARD NOTHING YET!

Concealed within the sleek Amiga shape, there is also a pro-quality sound synthesiser and four-track stereo sound system.

Driven by another powerful and unique custom chip, it can synthesise musical instruments and

sound

you to
Mix a
your
to she
throu
your h

‡Includes DeluxePaint from Electronic Arts worth £79 + VAT! (Excludes monitor or TV modulator.)

COMMODORE BUSINESS MACHINES (UK) LTD, COMMODORE HOUSE, THE SWITCHBACK, GARDNER ROAD, MAIDENHEAD, BERKSHIRE SL6 7XA. • TELEPHONE: (0628) 770088. TELEX: 846057 CBMUKG.

*Popular

AMIGA IS

Y

MIGA 500.
MPUTERS ARE JUST TOYS.



G YET! eek er and m. erful can its and

sound effects.

An optional digitiser allows you to take onboard real sounds. Mix and modify the two. Translate your compositions from keyboard to sheet music. Play them back through the monitor's speaker or your hi-fi.

Your Amiga can also synthesise the human voice.

It can speak back anything you care to write on the keyboard.

So this is one computer that can not only word process with faultless professionalism, and incorporate superlative graphics into the text, it can also read the text back to you aloud.

GAMESMANSHIP AND WORKMANSHIP!

The new Amiga 500, in fact, dumbfounds its competitors in every way.

Graphics, stereo sound, multi windowing, multi screens, 512K to 1Mb RAM (expandable by an incredible 8 further megabytes externally**), 3½" internal disk drive with 880K of mass memory, 4 unique dedicated chips plus the 16/32-bit power and 7.14MHz speed of its central processor, communications and vast expansion potential all add up to a computer of immense professional capability.

Yet the same technology allows the Amiga 500 to play games so mind bending that only full-scale arcade machines have been able to play them until now.

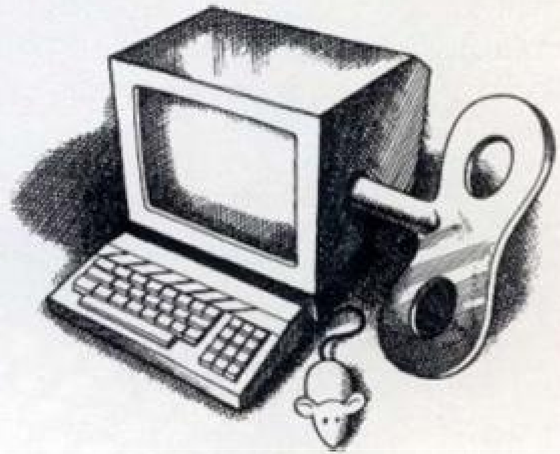
AND AMIGA MEANS 'FRIEND'!

However many of the Amiga's extraordinary talents you find yourself using, they will all be beautifully simple and natural.

You will be totally at home in the friendly and effortless Amiga environment, where everything happens by windows, icons, mouse and pulldown menus.

And the Amiga 500 simplifies life in another way too.

There is now no comparable home computer. At any price.



Try the astonishing new Amiga 500 at your nearest Commodore Amiga dealer.

And discover why *Personal Computer World*†, having tested the graphics performance of Amiga's latest and most powerful rival, concluded "...Amiga still reigns supreme..."

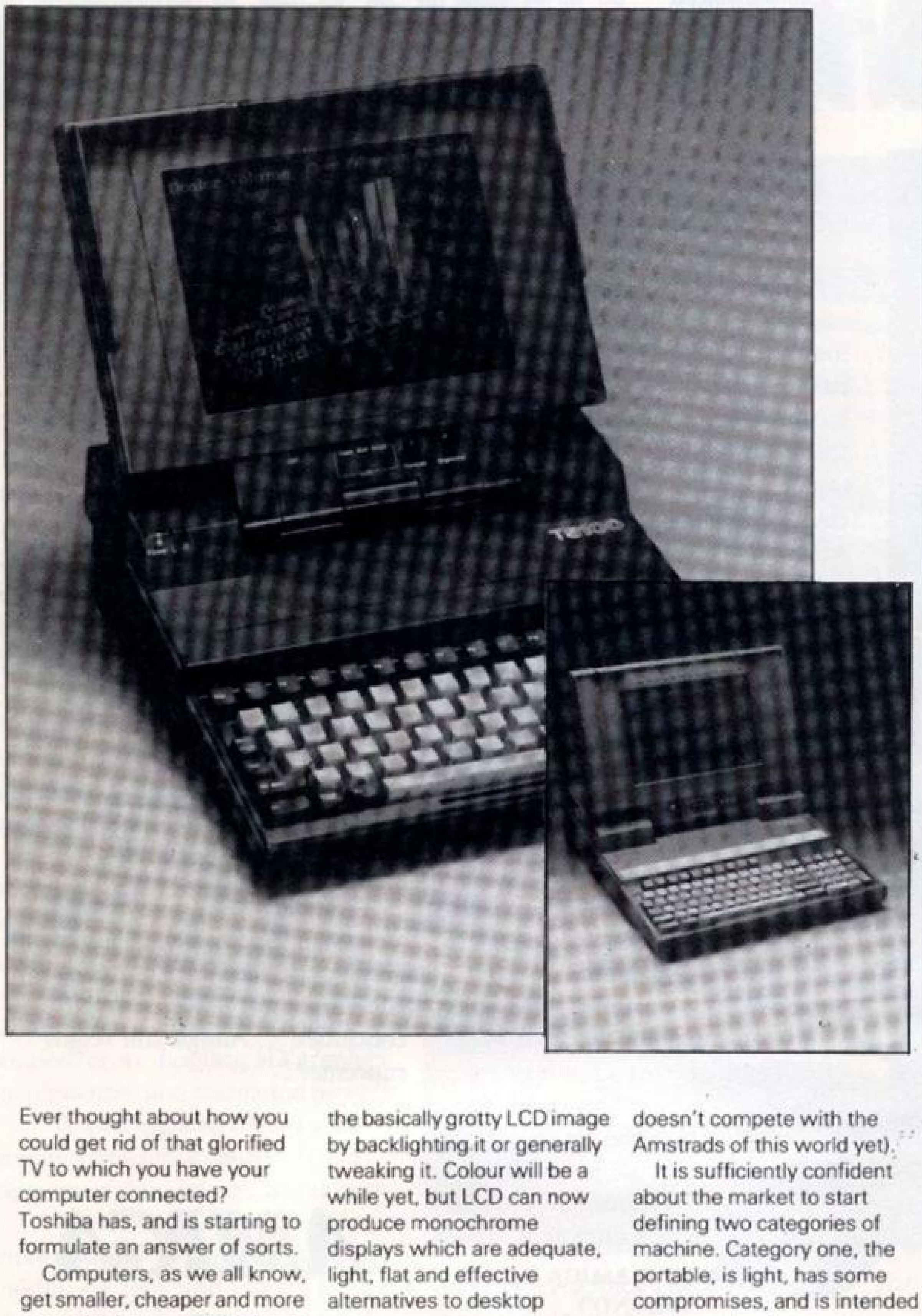
AMIGA

Commodore

**Popular Computing Weekly, 22-28 May 1987.* †*Personal Computer World, February 1987.* ***Subject to availability.*

7CBMUKLG.

Toshiba displays its engineering expertise



● Left: Toshiba's new 286 laptop £3,995 will stretch your pocket money, as will the world's first portable 386 (inset) at £4,595.

Ever thought about how you could get rid of that glorified TV to which you have your computer connected? Toshiba has, and is starting to formulate an answer of sorts.

Computers, as we all know, get smaller, cheaper and more powerful, but a major brake on this development process has been the Cathode Ray Tube (CRT). This, the traditional method of displaying whatever you happen to be doing on the micro, can only be reduced so far in size – it's hot, bad for your eyes, bulky and heavy. LCD (Liquid Crystal Display) is one alternative, and in recent years companies have been able to improve on the basically grotty LCD image by backlighting it or generally tweaking it. Colour will be a while yet, but LCD can now produce monochrome displays which are adequate, light, flat and effective alternatives to desktop displays.

Toshiba is currently the world's foremost portable computer supplier, and its most recent launches, although still outrageously pricey, give an indication of the way the portable market is going. The company now has 80286 and 80386 machines that are comparable in price to rival desktop micros (although at £4,595 the 386 machine doesn't compete with the Amstrads of this world yet).

It is sufficiently confident about the market to start defining two categories of machine. Category one, the portable, is light, has some compromises, and is intended to be used on the move regularly, while category two, transportable, is functionally similar but heavier, more powerful, and ultimately aimed at blowing the CRT-based desktop PC market away. It's a long-term Japanese gameplan, by no means specific to Toshiba, but we should start to see the effects over the next couple of years.

Letter from France

Talk to someone about French communications and they'll suggest you pay a visit to the chemist. Our Gallic brethren are, however, increasingly clued up on telecomms, in no small part thanks to French households just being given Minitel adaptors (Minitel is the local equivalent of Prestel).

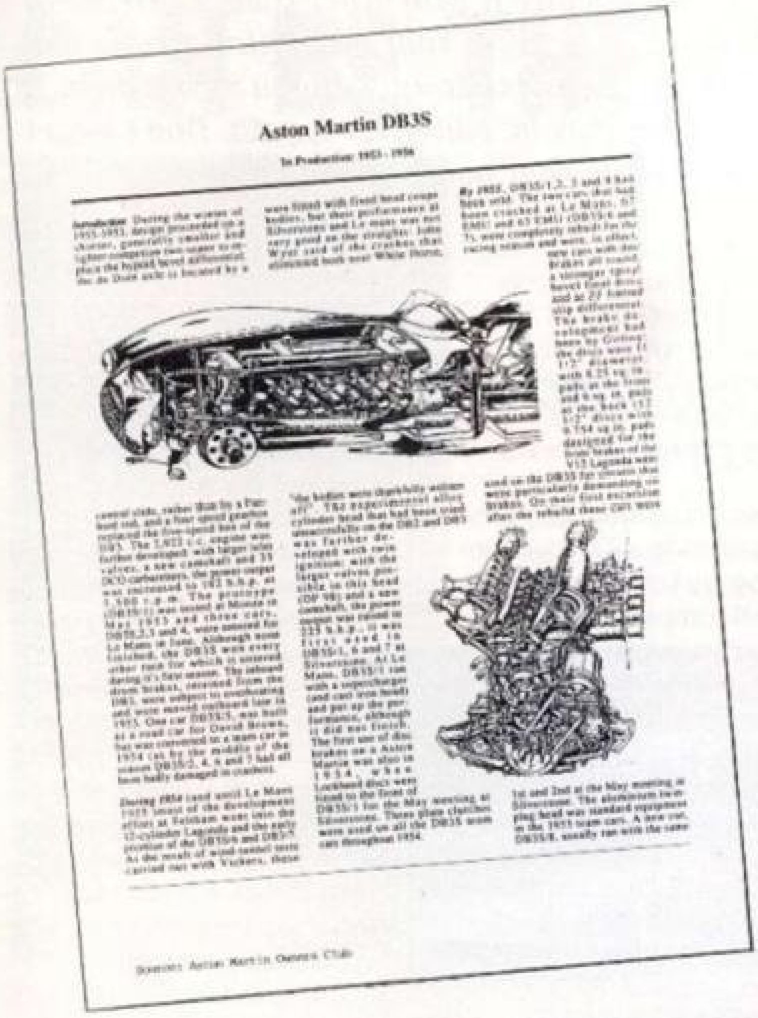
Kortex is a French company which has done well out of this process, gaining 70 per cent of the French market in the last couple of years. It is now launching three modems plus allied comms packages in this country. The KX-TEL is Prestel-compatible and will retail at £149, while there will also be two Hayes-compatible beasts at £299 for 1200 and £399 for 2400 baud.

The Elite is still not quite good enough

Back at the 1985 PCW Show Atari had "an Elite-like game" down on its list of prospects for ST software.

The good news is that it's nearly here, the bad news being it's missed another PCW Show.

Elite publisher Firebird Software has finally roused itself from catatonia (a suburb of Barcelona) and launched the PC version of the game which, solid graphics aside, is really like the classic BBC B version launched three years ago, and is proposing to honour us with the ST version shortly afterwards. Spit as you buy them, but buy them – they could have been much better by now, but they'll still be amazingly good.



Aston Martin DB3S

Low-cost scan scam

In a move which may turn out to be more strategic than is apparent on the surface, Digital Research has launched a low-cost scanning software package, Gemscan. As it stands it's no big deal, even at £70 – Gemscan will run with the various other Gem software packages and allow you to pull pictures into the company's various presentation graphics, design and desktop publishing programs. Realistically DR can't hope to sell many Gemscans to individuals simply because the available market is for the biggish micro, scanner and probably laser printer running under Gem – this is thought to be a number running well into the high severals.

But if you look at it from the other end you see DR with quite a tasty suite of software centred around Gem Desktop Publisher.

Gem DTP can be used to drive a laser printer and can import documents from First Word Plus (which can import from a whole series of other packages), along with graphics from Gemscan and computer-generated artwork from Gem Draw and Gem Paint.

It's all there, and is just crying out for someone to buy it from DR and put it out along with some low-cost desktop publishing hardware.

NB Amstrad is planning to launch a 386 machine and a laser printer. No word as yet on the scanner . . .

Commodore creates the cost-cutting coupon

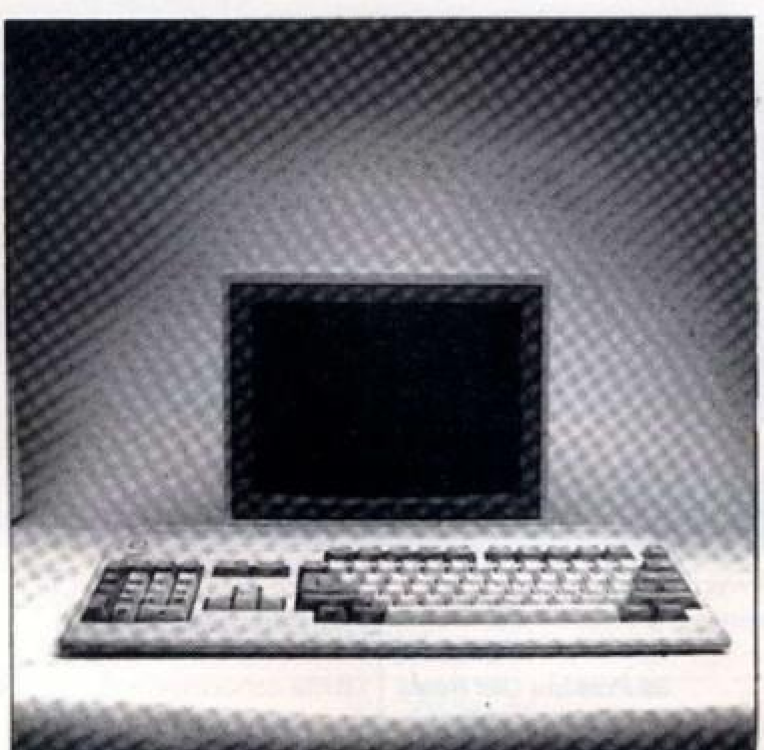
Commodore sliced £100 off the price of an Amiga A500 during September. The price cut was presented in the form of a coupon for existing Commodore users only, so if you ever sent in a Commodore guarantee registration form you should have received a £100 coupon in the post.

Commodore did this last year with the Amiga A1000, and naturally the price stayed down after the offer ended and another discount scheme, as yet unspecified, is on the way. The ST is still cheaper than the A500, but Commodore does now sponsor Chelsea.

Commodore's US parent has meanwhile turned in a $28.6 million profit for 1986/87, so it looks like the company has finally turned around. Appearances may, however, be deceptive, as Commodore has been through some pretty savage cost cutting and turnover was down from $889.3 million to $806.7 million. Of this only 25 per cent was accounted for by the USA.

A lot of Commodore's current earnings therefore depend on the continuing micro boom in Germany and on developing other overseas markets. It desperately needs to pull its US sales back up (there are about 55 million people in West Germany and 200 million in the United States – QED . . .).

● **Below: Further discounts for the Amiga?**



Scanning device developed for printers

Database Software is attacking the fax market with a neat piece of constructive thinking. A printer takes data from a computer and puts it onto paper, check? So if you want to take data from paper and put it in your computer you just run it backwards.

Well, not quite. The Masterscan is basically a scanner unit that clips on to the print bar of an Amstrad PCW printer and scans the paper you're feeding through it into memory. You can then send the image down the phone line and pick it up on another micro.

Right now it won't communicate with a fax machine, but Database says it's working on it, for the benefit of those people who can't afford a PCW.

letters

Something to say about personal computing? Why not share it with other readers? Write to Readers' Letters, Your Computer, Greencoat House, Francis Street, London SW1P 1DG. Letters may be edited for length. Don't forget to include your name and full address.



The Spectrum +3, the last of a dynasty?

The last word on Spectrum

I was very interested in your article on "The Last Spectrum" in the September issue and although the content regarding the actual machine was good(ish), I was more than a little surprised that the view is being taken by some people that the Spectrum is on the way out.

I would have thought that this new specimen of Alanus Sugarus with disk drive etc. pointed the way to a more fulfilling and dynamic future. The cost of 3" disks is on the way down at last and the faster and easier access to a large memory (disk/ramdisk) should promote better programs of all types, especially adventure/strategy games of the *Lords of Midnight* vogue.

I know many people who have Spectrums and use them for business or word processing (and recreation) and wish to make their computing operations more efficient but do not wish to change their computer. The +3 is starting to satisfy most of these needs.

I hope to see, in the near future, a GEM-type front end complete with mouse added to the Spectrum and perhaps a larger memory. Also, it might be possible to have a couple of specialist chips included to improve, say, the screen/graphics display without affecting compatibility.

S. J. Mckilroy, Moulton, Northampton.

Problem solved

With regard to the letter printed in the September edition of *Your Computer* from Mr. Twycross about printing *Artist II* images on a Brother printer.

I have solved the problem, albeit rather crudely, by writing a program which loads in the image, then prints it using a choice of two sizes. One is a small COPY print (I use it for proofs) and the other is a large rotated and shaded print.

I would be happy to let Mr. Twycross have a copy if he sends me a blank tape.

P. B. Cook, 30 Preston Old Road, Marton, Blackpool FY3 9PL.

From Spectrum to printer

I own a Spectrum computer upgraded to a ZX Spectrum+. Recently I obtained a serial 8056 compact printer with RS232 serial interface.

A problem has arisen in that I cannot connect the printer to my ZX Spectrum+ because of the type of lead on the printer and it will not fit my present Ram turbo joystick interface.

Could you please inform me how I can fit the printer to the computer either by modification or by purchase of an interface and from where I can purchase any such item? My local dealers have been unable to help me concerning this matter. Could you also tell me where I can obtain paper for the printer?

G. W. Starr, 4 Bryn Benarth, Conway, Gwynedd LL32 8LG.

Looking for a Lynx

Please could any of you reading this article help me? I have owned a Lynx 48K for a good four years. I have lost touch with any of the user groups and would like to know if there are any still going.

Also, I have a modem for it but cannot get hold of any communications software such as BSTAM.

Steven Fenton, 11 Thirsk Close, Bury, Lancs, BL8 1DY.

The fine art of compression

I write concerning Peter Gerrard's article on adventure text compression and D. Snocken's letter in the September issue of YC.

I am currently writing an adventure system on the Amiga and have considered two different methods of compression. The system of using fewer bits to store more commonly-used letters would achieve around 40 per cent compaction regardless of text size.

If the average word size in adventure text is five bytes (four letters plus a space), then D. Snocken's method, using a two-byte word number instead, would achieve up to 60 per cent compression if the amount of text was so large that the memory needed to store the dictionary was an insignificant fraction of the total.

This would be a good system for adventures on the scale of Infocom's interactive fiction and for running on 16 bit computers with hundreds of kilobytes of memory. An adventure running on an 8-bit machine, however, would be unlikely to have more than, say, 25K of text with 5,000 words and 3,000 (remember that words like "axe" and "axes" would be considered different). Compressed, this would be only 10K for the tokens but 15K for the dictionary, so the end result would be little or no reduction in size.

On 8-bit computers the other method is therefore more efficient. I fail to see how it is more machine-specific (unless D. Snocken thinks that some computers don't use binary numbers!). It would be difficult to implement in Basic of course but Basic is not suitable for serious programming anyway.

Russell Wallace, Dunloaghaire, Co. Dublin, Ireland.

FOR AS LITTLE AS £159 YOU CAN BE THE HOME SECRETARY.

There's more to home computers than fun and games.

Just add a printer (and the necessary software) and your computer becomes a word processor. And you become a very efficient secretary.

If the printer you add is the Amstrad DMP 2000 your efficiency will even extend to saving quite a lot of money.

Because the DMP 2000 costs just £159 (incl. VAT).

Yet it will print draft quality text at up to 105 characters per second. And Near Letter Quality at up to 26 characters per second.

As you would expect it is compatible with all Amstrad home computers. But it is also compatible with Epson and any other make that has the same Centronics Parallel Interface.



NEW

If you've already graduated to a PC there's the new Amstrad DMP 3160 printer.

It's compatible with all Amstrad PC's as well as Epson and all other IBM compatible PC's. It costs just £199 (plus VAT)*.

Both printers have easy front loading and both will take ordinary A4 paper. One of them is bound to be right for your particular home office.



Please send me further information on the DMP 2000 ☐ and the DMP 3160 ☐

NAME ____________________

COMPANY ____________________ TELEPHONE ____________________

ADDRESS ____________________ YC11

AVAILABLE AT: ALLDERS · COMET · CURRYS · DIXONS · LASKYS · JOHN LEWIS · AND GOOD INDEPENDENT COMPUTER STORES

*Recommended retail price including VAT, £228.85. Prices correct at 1·9·87 but may change without notice.

AMSTRAD

Amstrad plc., PO Box 462, Brentwood, Essex CM14 4EF. Telephone: (0277) 262326.

letters

CONTINUED

"Outrageous Sexism" outrage

Why does Rebecca Winston in her letter "Outrageous Sexism" (September issue) so hyprocritically talk only of men exploiting the female body?

Some of her wrath at least should be directed at the females who so unashamedly exhibit their bodies to the male, for money, and not always at the male who does all the paying.

G. Lewis (Ms.), Peebles.

• • • • • • •

School for scandalised

I have been buying your magazine virtually since the first issue. It has always given a wide coverage to different computers and seems to have been pitched somewhere between the purely games-orientated magazines and the more serious ones such as *PCW* or *Byte*. This has made it ideal for use in schools and the school library now stocks it. When parents have asked for advice on magazines I have mentioned *Your Computer* along with the various machine-specific magazines.

This situation will now change dramatically. The library will no longer stock your magazine and I will do all I can to persuade kids not to buy it. Why? Well I suggest you look closely at page 17 of your September issue and the image it generates.

Getting girls to use computers in a co-ed school is far from easy. Generally it is the boys in the family who are bought computers as presents. The pressures in society exist to say that computing along with physics, engineering and technology are male domains. Girls who excel at these are very much the odd ones out. This is a great pity as I do not believe that there are boys' subjects and girls' subjects; there are just subjects. A girl can be every bit as good a scientist or engineer as a boy.

The only way I can see of overcoming this problem is actively to encourage girls into things like computing. Your magazine should at least be neutral even if it can't have a positive attitude in this respect. Looking at the aforementioned page, you seem to show a completely negative attitude. I refer to the juxtaposition of Rebecca Winston's letter and the Barbarian photograph. By putting the two together like that you seem to be implying, "Yes, we've read your letter, considered your views, now sod off. We'll print exactly what we want regardless of how offensive you find the material."

I hope I'm wrong but that is certainly the impression you have generated with me. If you don't like your editorial policy being challenged, don't publish the letter.

I don't object to the photograph as such. I certainly wouldn't mind Maria draping her charms over me. However I do see it as sexist and I can understand it causing offence. You do have a responsibility towards your readers and what is acceptable within the pages of *Playboy, Lovebirds* or a science fantasy magazine is not acceptable in a serious computer mag. I repeat, my objection is not so much to the photograph but rather to your treatment of someone who criticises it.

In writing this I do assume that you want to keep your jobs and don't want to become part of Maggie's army. The recent drastic editorial shake-up suggested things weren't all roses. If you are going to antagonise and lose your readers by a totally irresponsible editorial attitude then the magazine deserves to go bust and you deserve to end up on the dole.

Ian O'Hara, Head of Computer Science, Marlborough School, St. Albans, Hants.

• • • • • • •

Why add insult to injury by publishing the Barbarian picture again in the September issue?

William Lawson, Newport, Dyfed.

• • • • • • •

A man, a woman and a beach

I refer to the letter entitled "Outrageous Sexism" (YC September 1987) in which the Barbarian advertisement is criticised as sexist.

To the best of my knowledge, sexism is the exploitation of one sex by the other. The picture shown, however, has the semi-naked bodies of both a man and a woman and I am sure you will agree that the woman's large breasts are equally matched by the man's over-muscular body, so sexism is out.

To my mind this picture exploits commercially both male and female. If Rebecca feels offended by it, may I suggest that she does not let her eyes stray to the top shelves of her local newsagent where true pornographic sexism is used for financial profit.

Finally, may I point out this relatively tame scene can usually be viewed on beaches when the weather is hot. If men and women wish to dress in this manner, is there any reason why magazines should not publish photographs of them, for promotional purposes or otherwise?

Mark Richardson, Wallsend, Tyne & Wear.

Fan mail

I have been reading your magazine since its re-emergence and have been constantly disappointed at its standards throughout.

The biggest stumbling block is the way you use pictures and diagrams. Instead of accompanying articles they seem to dominate. As a result the articles themselves are short and unsatisfactory, usually only skimming the surface with their content.

Your use of pictures is also often inappropriate. If you have limited picture space for a review, use those that are relevant. Show screenshots of the products, not the packaging!

The letters page is another area where not enough care is taken. Wouldn't it be better to have a separate problems page with a technical expert? The editor doesn't seem to give a sufficient answer to the readers' queries. In the September issue S. Morris from Portland asked about the suitability of the Acorn Archimedes and Atari PC for his work. The Editor omitted the lack of expansion potential in the Atari PC, a fact which Mr. Morris should not be without, and did not suggest that other PC-compatibles might be a better buy. For a good problems page, look at *Popular Computing Weekly*.

Finally, reviews. When an article claims to do something, it should do just that. In the review of the Spectrum +3, the only better deal that John Wase could find was the Amstrad with monochrome monitor. Where was the obvious contender – the Atari ST? This is a computer outclassing the +3 in every respect for £50 more.

Please think about these comments because your magazine could be much improved and refined with a little thought.

Ben Wharton, London NW6.


PLANNER 1295
LOGOTRON
High-quality, low-cost personal productivity software
SPREADSHEET
£12.95
WRITER 1295
LOGOTRON
WRITER 1295
INCLUDES 100,000 WORD SPELLCHECKER
High-quality, low-cost personal productivity software
Includes 100,000 word spellchecker
WORD PROCESSOR
£12.95
FILER 1295
LOGOTRON
FILER 1295
High-quality, low-cost personal productivity software
DATABASE
£12.95

line noise

Communication

Birminghamn based PMS Communications Ltd is responsible for a range of comms terminal software solutions. PMS Dialup is for the BBC Micro, IBM PC and compatibles, especially the Amstrad PC, the Amstrad PCW, plus various MS-DOS based machines including the RML Nimbus and the Apricots.

In this article we take a look at the PC version of Dialup, though some observations mentioned here may apply to other versions too because the Dialup range is designed with uniformity in mind; someone using Beeb Dialup, for example, should feel perfectly at home with PC Dialup.



For your £90, minus a few pence, you get a plastic A5 box wallet containing a hard-backed spiral bound A5 manual, a disk and a function key crib template. Earlier versions of Dialup were also supplied with a modem lead – complete with in-line dongle, designed to prevent pirate distribution of the disk. Thankfully, PMS has now abandoned that particular idea. Lose your lead or get stuck with a faulty dongle, and that's that!

One nice feature of Dialup is that registering via a special form supplied will make you eligible to log into PMS's own Dialink bulletin board. You will then be able to download system disk updates as and when they become available.

On version 2.1.7 of PC Dialup a README.TXT file on the disk outlines various revisions all the way from 2.1.1. There is no indication that 2.1.7 is the definitive final version, so the Dialink facility could prove useful in the future, ensuring your package won't be left behind when some new-fangled file transfer protocol comes along.

Dialup itself is a package very simple to use. Everything is menu-driven, though annoyingly menu functions cannot be accessed directly with a single keypress. The menu must be scanned using arrow keys and the selection made via the return button. This is all very well for a newcomer to the program but it soon becomes an obstacle to using the system quickly.

Most competing comms packages for the PC have their own command language in addition to a menu system. Seasoned users who have memorised commonly used commands can then do away with cumbersome menus. Command languages can also be used to perform functions automatically through pre-programmed sequences of instructions. For example, you might want simply to boot the disk. Choose your command file and off it goes, automatically selecting, say, Prestel via a certain telephone number, then printing off your waiting messages and finally logging off. Dialup can't do this.

The same applies when it comes to accesssing MS-DOS commands. Again you're restricted to menus and there is no way of getting to an MS-DOS prompt without exiting the program.

Those are most of the grumbles dealt with, because underneath the unnecessarily simple menu structure is a very capable package indeed. Dialup can cope with both viewdata colour displays (Prestel, Micronet, etc.) as well as scrolling text services (bulletin boards, Telecom Gold, etc.).

A very wide range of file transfer protocols are supported, including XMODEM, Kermit and PMS's own Dialup protocol for its Dialink database. Naturally, XON/XOFF flow control is available and hardwired RTS/CTS handshaking means that using Dialup via a serial link to another computer directly is perfectly feasible. Spooling text both to and from a host computer is possible.

For PC users, PMS Dialup will probably be very attractive to those who want to access viewdata databases like Prestel. Emulation of the alpha-mosaic colour graphic teletext display on a standard PC is not easy but Dialup does a reasonable job using four colours, though flashing is not supported. Fairly unique to Dialup is a special viewdata display mode for the Amstrad PC which supports all 8 steady colours, but once again there are no flashing colours.

PMS has done a good job with its viewdata display. It is fast and not prone to waiting for a whole screen to be displayed before accepting page commands. Unfortunately, like most of its rivals, Dialup doesn't quite handle double height graphics and text properly, leaving bits of the text behind on some demanding animated dynamic frames. As PC viewdata emulations go, however, Dialup is one of the best.

Both viewdata and scrolling terminal displays feature a status line at the bottom of the screen which contains a digital clock display, the emulation

news from Phil Rotsky and Ian Burley

type and various other system conditions.

Viewdata frames can be saved to disk and viewed afterwards, though frame management is rudimentary and once again those blessed menus get in the way. To get between one viewed frame in your store to the next, you need to go back to a menu. Why on earth PMS doesn't allow you to skip through frame by frame at a single keypress is difficult to fathom.

Again, like most of its rivals, PMS Dialup has no mailbox/frame editor for offline preparation of messages or frames. Though not unusual, it's a pity PMS has not included this facility. Perhaps it will be possible to download a new version of Dialup via Dialink with an editor at some time in the future. How about it, PMS?

An important feature of the viewdata terminal is the inclusion of Prestel CET telesoftware downloading. There is currently very little PC telesoftware on Prestel to be had, but Micronet has been experimenting with PC telesoftware recently. If you really want to, you could download files meant for other machines.

Scrolling terminal emulation is quite straightforward, and some nice touches include EPAD error protection protocol support for accessing services such as PSS reliably. Another nice feature is a toggle for the return key to generate either a carriage return or a hash; useful for either the viewdata or scrolling terminal. One feature missing from Dialup, which is becoming increasingly popular on scrolling terminals, is a split input and output screen. This is very useful for online conversations and playing MUGs (Multi User Games).

Micronet Enhancements

Micronet has announced an array of enhancements to its service on Prestel for the micro. Important news for all serious players of the Shades MUG (Multi User Game) on Micronet, this will now be accessible in scrolling ASCII texsst form. This may not sound too unusual but Shades has been restricted until recently to 40 column viewdata non-scrolling format via a clever gateway PAD software called Window Message Mode.

This splits incoming ASCII text into viewdata chunks, adding colour too. Viewdata terminals do not scroll, so the PAD admits one screen worth of incoming text at a time. As soon as one chunk has filled the screen, the text input stops and the PAD waits for you to tell it to continue. An input window is segregated at the bottom of the screen.

Most Shadists have found this arrangement perfectly adequate but some (aspiring) Wizards and Witches can't make use of specialist MUG terminal software features because they are only designed for scrolling displays, usually in 80 columns. You can also see more of what's going on with an 80 column screen; hence the introduction of the 80 column PAD alternative.

The Micronet Telecom Gold gateway, Interlink, also uses a Window Message Mode system and there are also plans to provide the traditional ASCII display to this gateway as well, making spooling to and from mailboxes etc. much simpler if you have the right terminal software, which most comms packages do these days.

Two of Micronet's most popular non-micro specific features, Bizz-Net and XTRA!, a small-business advice database and 'alternative features' area respectively, are to be available to non-Micronet subscribers. Previously, all Micronet features were 'hidden' from ordinary Prestel subscribers who don't have access to the Micronet CUG (Closed User Group). The two areas will remain free to Micronetters, though outsiders will be tariffed at 4p a minute to look at Bizz-Net pages and it will cost 2p a minute to read XTRA!. Enhancements to the two feature areas will accompany their release outside the Micronet CUG.

Using experience gained from the Shades MUG, Micronet will soon be offering 'tele-conferencing' online. Think of private rooms where several predesignated Micronetters can congregate and have conversations. That is roughly what tele-conferencing is all about. It will be offered as an alternative to some forms of chatline and could be used for club type activities, or even business conferencing involving remote salesmen. Like Shades, teleconferencing would be handled by an independent computer hooked into Prestel via a gateway. No launch date or tariffing has yet been set.

The BT real-time translator

British Telecom's Martlesham based researchers have demonstrated a computer-controlled, spoken language translation system which, in final form, will be used via ordinary public telephones. The system, which can translate English, French, Spanish, Italian, German and Swedish in either direction is currently run on a Merlin 5200 PC. The user speaks a word or phrase via a phone when prompted, then the sampled speech is processed by the computer which it attempts to repeat to you in synthetic speech. If it gets it wrong, you can say no and repeat the process.

Once it knows the speech text is correct, the system can make a cross reference to find the appropriate word or phrase in another language. This can then, incredibly, be spoken to someone else at the other end of the telephone line. Yes, the idea is to have a translated 'real-time' conversation on the phone.

BT claims to have solved many accuracy and speed problems by using simplifying techniques in its dictionary and phrase book. By using just 100 recognised key words, the route to over 1000 dictionary words of 400 phrases can be accomplished more efficiently. The system is nothing more than a hi-tech demo at the moment, but a similar system will probably come into commercial use in the not too distant future.

Micronet Modem

Micronet has joined forces with Pace once again. It already supplies a customised Pace Commstar I ROM to Beeb subscribers. This time it is to badge the popular Pace Linnet V21/V23 intelligent modem. This new Micronet modem will be bundled with a year's Micronet subscription, appropriate terminal software and a lead, to provide a turnkey introduction to Micronet. As we went to press, package deal prices weren't finalised, but a PC solution, for example, will cost £199 plus VAT and other packages will be available for users with BBC Micros, Commodore 64s, Amstrad PCs, PCWs and CPCs, Sinclair Spectrums, Atari STs and possibly Commodore Amigae.

line noise

10,000 Microlinks

Microlink has notched up over 10,000 messages on its private Telecom Gold Bulletin Board facility. The sender of that milestone message, Cameron Lacey from Grimsby, won a bottle of champagne for his efforts.

For the Microlink operators, however, that message turned into a mini nightmare as it actually crashed the whole board. It turned out that the BB software was written to handle just 9,999 entries.

Mercury Secures BT Telex

Mercury has won its struggle to link its domestic telex system into BT's international telex network. This follows an agreement between the two companies last year to link respective domestic networks. However the news only comes after Mercury called in the communications watchdog body, OFTEL, when no agreement could be reached between Mercury and BT International.

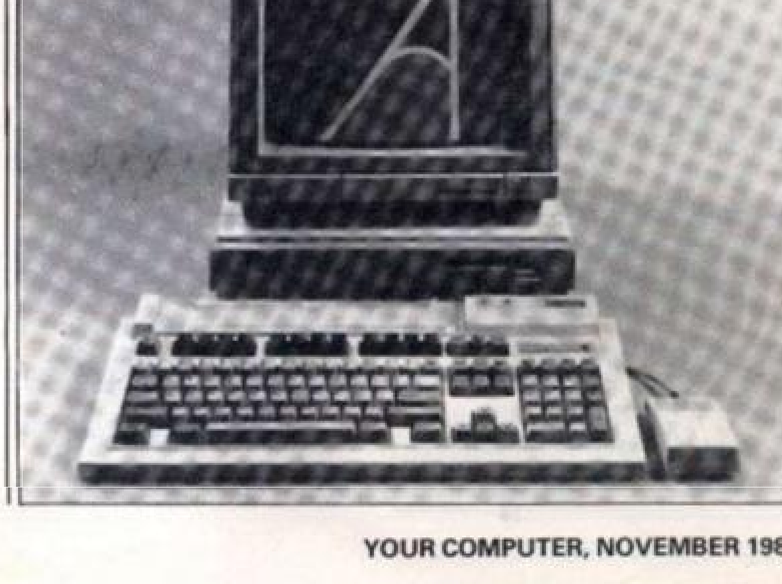
Archimedes online

Beebug, the 20,000 strong BBC Micro user group, has announced that it is to market a range of internal modems for Acorn's new Archimedes RISC based personal computer. Kevin Kirk's new company, Anglo Computers, is currently working on the hardware and Beebugsoft is re-jigging its Command comms terminal to work on the Archimedes in conjunction with the new modes which will fit internally as 'Podules' – peripheral modules.

Kirk tells us that the new modems will be a far cry from the old Magic Modem, which is still sold by Beebug. Hayes compatability is promised, along with online audio monitoring via the Artchimedes inbuilt speaker, V21/V22/V22bis speeds and auto-answer for host use. Beegug's Adrian Calcraft confidently expects the modems to be ready by the end of the year, though no units will be shipped until BABT approval has been secured. prices and final specifications will be announced then.

Anyone keen to get online with an Archimedes before then might have problems. There is a bug in version 0.20 of the Achimedes operating system (Arthur) which renders the RS423 serial port useless. Acorn expects to fix the bug in release 1.00 about now.

Meanwhile Beebug is currently waiting for final BABT approval on another Kirk modem, this time a long awaited internal modem for the BBC Master. The V21/23 device, which leaves the Master serial port free for other uses, will cost about £100 and once again a special version of Command will drive it.



TRI CAMPUTER SAFTWARE Ltd
SUPPLIER OF COMPUTER HARDWARE AND SOFTWARE



APPLIED VISIONS

PRICE NOW REDUCED TO £175 INC FOR ALL AMIGA MODELS

The Future Sound™

COMMODORE MICROCOMPUTERS NOV/DEC 1986
QUOTE
Our favourite sound digitizer is Futuresound from Applied Visions.
It comes complete with microphone, interface, good software and decent documentation. It is a good buy and may be the choice digitizer for programmers who need sound effects in their programs.

DELUXE NEWS MAY 1987
QUOTE
The OPEN THE POD BAY DOORS HAL Line that appears on the Deluxe Video demo disk was actually one of the very first recordings ever made using Futuresound.
Futuresound the premier audio digitizer for the Amiga.

CCI JANUARY 1987
QUOTE
A sound created with Futuresound and saved in IFF could be read into INSTANT MUSIC or DELUXE MUSIC for further manipulation.
Using Futuresound is simply a matter of making certain that everything is properly connected and then loading the software.
If Deluxe Paint made you look, then Futuresound will make you listen.

YOUR AMIGA JULY 1987
QUOTE
Futuresound is a professionally presented product, from the solidly built hardware to the neat manual with large type and clear diagrams. If your hobby stretches to £175, or sound sampling is something you need to achieve on the Amiga, then I am unaware of a better way of performing it.
By Anne Owen

FUTURESOUND is fully IFF compatible (actually three separate formats are supported) your sounds can be used by most Amiga sound applications. Such as Aegis Sonix, Deluxe Music Construction Set, and Deluxe Video Construction Set from Electronic Arts.
With Futuresound and Deluxe Video your video creations can use the voice of Mr Spock, your mother in law, or a disturbed super computer.
Programming support is also provided. Whether you're a "C" programming wiz or a Sunday afternoon Basic hacker, all the routines you need are on the non-copy protected diskette.

TRI THE FUTURE SOUND FOR YOURSELF IN OUR NEW PREMISES AT 161-169 UXBRIDGE ROAD, EALING, LONDON W13 9AU. TEL: 01-840 6136

APPLIED VISIONS INC., SUITE 2200, ONE KENDALL SQUARE, CAMBRIDGE, MA, USA. 02139 (617) 494-5417
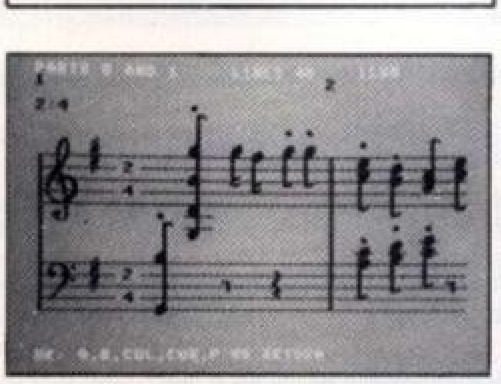
MUSIC SCORE

WHETHER YOU WISH TO SOUND LIKE THE BOSTON SYMPHONY ORCHESTRA OR THE BEASTIE BOYS, THERE SHOULD BE HARDWARE OR SOFTWARE TO HELP YOU EMULATE THEIR SOUNDS ON A MICRO. TONY SACKS REPORTS



● **Below: The Cheetah Digital Drum Machine – more reliable than your average brainless drummer**





● **Left: Music notation display from Joreth Music follows the conventional stave system**

Samplers, sequencers and MIDI – you've heard of them but you're not quite sure what they are. And, in any case, you're tone-deaf so you haven't taken much interest in the music-making potential of your micro.

If this is your attitude you could be depriving yourself of a great deal of pleasure. You don't have to be a Beethoven or a Springsteen to make interesting sounds with a home computer. Software and hardware packages are available for almost every home micro to turn it into, at least, a sound-making device and, in many cases, a musical instrument.

Admittedly, some micros have attracted more musical hardware and software than others. These are usually machines such as the Commodore 64 and BBC computers with better-than-average built-in sound chips.

If you were buying a micro primarily for music-making, your first choice would probably be the Atari ST for reasons we will go into later. But other recent, high-powered machines such as the Commodore Amiga, Acorn Archimedes and Apple IIGS are all strong contenders. These last three all have sound chips with tremendous music-making potential but are still awaiting software packages to make full use of the chips.

Whatever your machine, you should be able to do something sonically creative with it.

There are several levels of commitment – both financial and musical – to micro music-making. At the most basic level you can squeeze musical effects out of the computer's built-in sound-chip – provided your machine is not one of the few, including earlier Spectrums and the Amstrad PCW range, which do little more than burp. At this level, the only outlay is on the software to drive the chip (and even this modest sum can be avoided if you are prepared to write your own software).

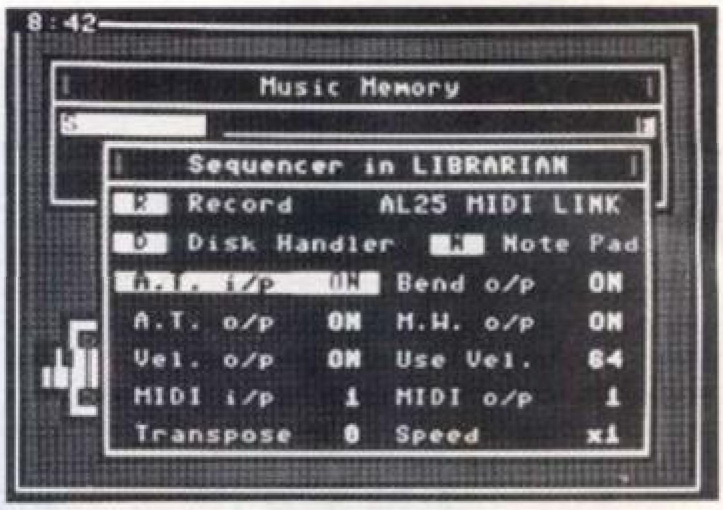
HARDWARE

The next level involves the addition of some relatively inexpensive hardware to coax more interesting musical effects from the computer than are possible using its built-in sound chip. For example, a more powerful musical chip can be hooked on to a micro to boost its musical prowess. Or, by using an encoder/decoder add-on, the micro's memory can be used to store brief digital "recordings" of sounds which can then be replayed via the same box of tricks.

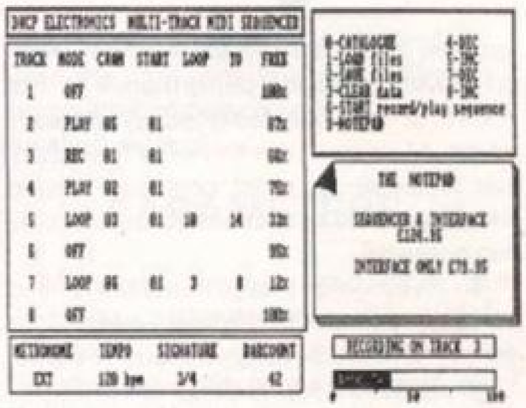
Finally, for the dedicated musician, the most costly (usually) but most rewarding and versatile (again, usually) option is to use the computer to control instruments such as synthesizers and electronic percussion simulators.

The first category outlined above – the software-only option – comes in two main forms. First, there are the programs designed to ease the task of program-

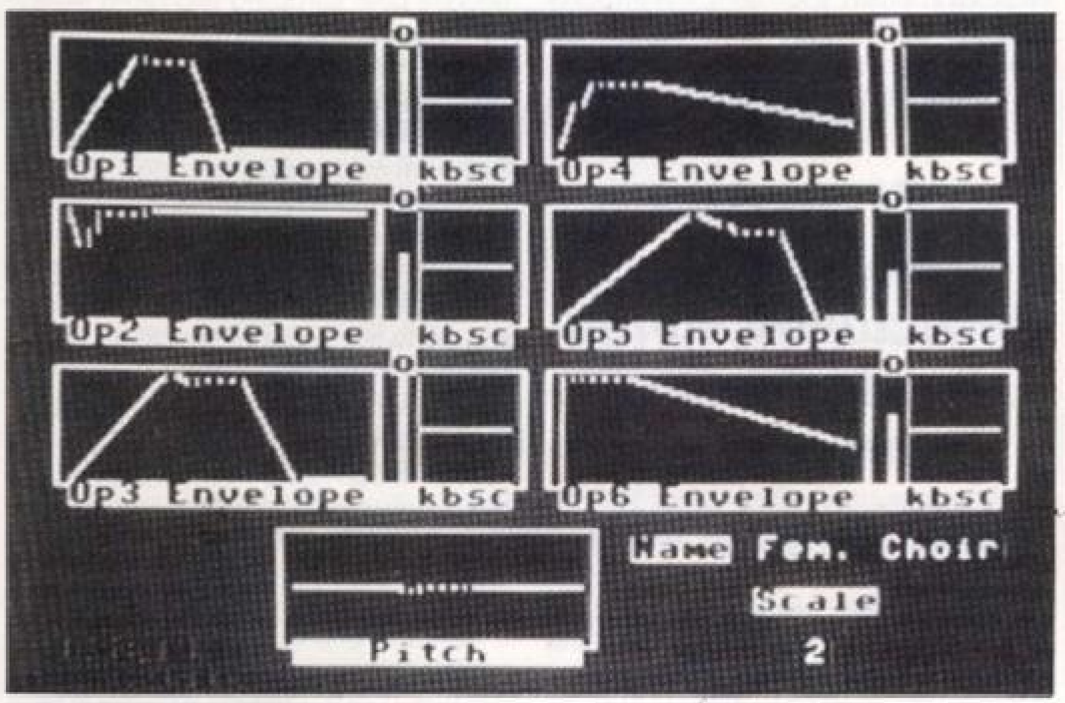




● Above: The sequencer of the Joreth Music System 7



● Above: DHCP provides an 8 track sequencer for the Amstrad CPC instead



● Above: The envelope display in System 7 from Jorteh Music



● Left: The loading screen for the Music Composer System from Joreth Music – now you can finish off Schubert's symphony

ming new sounds for the computer's sound chip. Although sounds can usually be programmed using a machine's Basic, this usually involves specifying a string of apparently arbitrary numbers. These programs introduce some logic to the sound-selection process, usually with the aid of graphs to show what effects changing the various parameters is having on the resultant waveform. The QWERTY keyboard is sometimes used as a makeshift musical keyboard.

The second broad category of programs relying on the built-in chip consists of those which allow notes to be placed on a musical stave displayed on the computer's screen. The resulting composition can then be played back through the sound chip. These programs provide a useful introduction to musical notation and arrangement. Activision's Music Studio, which allows non-musicians to use splodges of colour instead of the conventional sticks-and-blobs musical notation, is a particularly good example of this type of program. Another is Rainbird's Music System for the Amstrad CPC and Commodore 64 computers.

ADD-ONS

If you are caught by the music-making bug, sooner or later you are likely to get tired of the rather thin sounds produced by the micro's sound chip. Though these chips do a sterling job providing musical and sound effect accompaniments for

MUSIC SCORE



Addresses

Activision, 23 Pond Street, London NW3 2PN. 01-431 1101.
Cheetah Marketing, Norbury House, Norbury Road, Fairwater, Cardiff CF5 3AS. (0222) 555525.
Datel Electronics, Units 8/9, Fenton Industrial Estate, Dewsbury Road, Stoke-on-Trent. (0782) 273815.
DHCP Electronics, 32 Boyton Close, Haverhill, Suffolk CB9 0DZ. (0440) 61207.
Electromusic Research, 14 Mount Close, Wickford, Essex SS11 8HG. (0702) 335747.
Hybrid Technology, Unit 3, Robert Davies Court, Nuffield Road, Cambridge CB4 1TP. (0223) 316910.
Joreth Music, PO Box 20, Evesham, WR11 5EG. (0386) 831615.
Microdeal, Box 68, St Austell, Cornwall PL25-4YB. (0726) 68020.
Rainbird, 74 New Oxford Street, London WC1A 1PS. 01-240 8838.
Ram Electronics (Fleet), Unit 16, Redfields Park, Redfields Lane, Church Crookham, Aldershot, Hants GU13 0RE. (0252) 850031.
Supersoft, Winchester House, Canning Road, Wealdstone, Harrow HA3 7SJ. 01-861 1161.
XRI Systems, 10 Sunnybank Road, Wylde Green, Sutton Coldfield, West Midlands B73 5RE. 021-382 6048.

games, it is expecting too much of them to provide a musical performance to rival those of purpose-designed synthesizer chips. Moreover, the three- or four-channel limitation of most computer sound chips severely restricts their music-making potential.

To overcome these restrictions it is necessary to turn to hardware add-ons for help. There are several varieties of these. One approach is to provide some sort of external sound synthesis circuitry which is controlled by the computer. Examples include Hybrid Technology's Music 5000 for the BBC computer, Music Sales' SFX Music Expander for the Commodore 64/128 and Yamaha's SFG-05 sound module for MSX computers.

All of these increase the music-making potential of their host machines substantially. All offer at least 8 channels of synthesizer-quality sound, with the option of producing different types of sound on the different channels, thus creating the effect of several instruments playing complementary parts.

The second type of add-on uses the computer's memory to store digitised versions of real sounds. The hardware here takes the form of an analogue-to-digital converter (with associated filters) for encoding the sounds and a digital-to-analogue converter to reverse the process. The encoding circuits chop up a sound into several thousand "slices" every second and assign a digital value to each slice which is then stored in the micro's memory. The slices can later be reconstituted to form the original sound.

SAMPLING

This form of digital recording – called "sampling" – can produce high quality renditions of brief sounds, the precise quality and length depending on the memory available in the computer. For a 48K or 64K computer, the maximum sample length will typically be less than a second of acceptable, but certainly not hi-fi, quality. For larger memory micros such as the new breed of 520K and 1M machines, samples of Compact Disk quality lasting several seconds are possible.

This may seem too short to have any practical applications, but there are ways of tackling this problem. Most natural sounds build up rapidly to their maximum intensity and then gradually fade away over the course of several seconds during which the sound quality does not change much. So, by repeatedly reading a section of a sample out of the computer's memory and playing it back with a slightly reduced intensity each time, the effect of a natural fading-away can be simulated even from a brief sample.

"Percussive sounds are particularly suited to storage as samples . . ."

This and similar tricks – such as reading the sample out of memory at different rates to achieve different playback pitches – allow impressive sampling effects to be generated from a micro and an inexpensive hardware and software package. Such packages are available at around £50 for many popular home computers – among them, samplers for the Spectrum from Cheetah Marketing and for the Commodore 64/128 from Music Sales and Datel.

A cheaper, specialised variation on the sampling theme – the percussion simulator – does away with the encoding part of the circuitry to produce a playback-only device. Percussive sounds are particularly suited to storage as samples because they don't last long and can be reproduced accurately using a relatively narrow sampling frequency bandwidth. This means that several different percussive samples can be held in a micro's memory at the same time and by playing these back at staggered intervals, a fairly convincing effect of a drummer at work can be produced.

Drum simulators are now available for most micros, some of them costing less than £30. Cheetah produces drum simulators for the Spectrum and Amstrad CPC, Supersoft has simulators for the Commodore 64/128, while Microdeal markets one for the Atari ST.

A particularly interesting add-on for the Spectrum and Amstrad CPC series is Ram's Music Machine. Not only does this provide both sampling and drum simulation, but it also bridges the gap to the third level of micro-based music-making – linking a computer to dedicated electronic music instruments such as synthesizers and drum machines. This bridge takes the form of a MIDI interface incorporated into the Music Machine hardware.

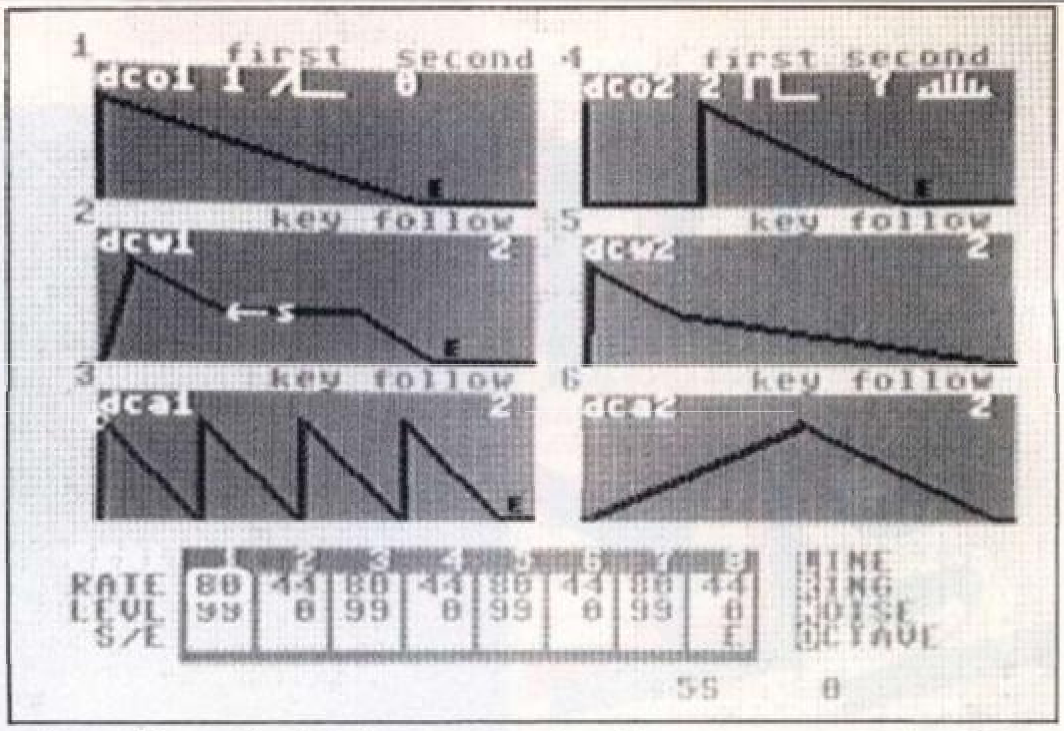
MIDI – the Musical Instrument Digital Interface – is a standardised hardware and software protocol which allows different makes and types of electronic instrument to converse with each other and with computers. It defines digital codes which flow along serial links between suitably equipped instruments, telling them which notes to play, when and, often, at what volume.

MIDI

MIDI was originally devised about five years ago to let different instruments talk to each other, but computers are increasingly joining in the conversations. There are several ways that this micro-to-instrument communication channel has been exploited.

The most popular and probably most powerful application of micros in a MIDI system is as recorders of MIDI data. As a musician plays a MIDI-equipped instrument, streams of digital codes defining what is being played flow out of the instrument's MIDI port. If this data can be fed into a computer, it is a relatively simple matter to store it as a digital "recording" of what is being played. The data can later be sent back to the instrument to recreate the original performance.

This ability to turn a computer into a



● **Right: Joreth Music has launched a Tone Editor for the Casio CZ Series**

MIDI recorder is, in itself, a useful tool but is made even more powerful by the fact that the MIDI protocol allows 16 different software "channels" to be defined simply by tagging an appropriate code on to each item of MIDI data. Any instrument receiving this data will only respond to information tagged with the channel number to which it is "tuned" and will ignore all other data. The same stream of MIDI data can thus contain different instructions for up to 16 different instruments (or groups of instruments), each one playing its own part.

What this means for the micro owner is that for the cost of a relatively simple interface and software package, a computer can be turned into a 16-track "tape recorder". Of course, it is a recorder of MIDI information, not sound signals, so direct comparisons are misleading, but it is worth remembering that a conventional 16-track tape recorder would cost well over £5,000. So the attraction to the musician of a micro-based multi-track recording system costing less than £200 (if based on a Spectrum) is obvious.

Moreover, the MIDI recorder can do several things that its tape-based counterpart cannot. For example, the speed of playback can be altered without changing its pitch simply by altering the rate at which the MIDI data is read out of the computer's memory. Also individual notes can be removed, added, shifted in time or changed in pitch, by editing the data in the memory.

Storing MIDI information as a musician plays is known as real-time recording or sequencing. A variation on the MIDI sequencer theme is the step-time sequencer in which notes are entered into the micro's memory one-by-one either from a musical instrument keyboard or from the computer keyboard, often by placing the notes on a musical stave on the screen. The attraction of this approach is that it allows musicians with limited playing abilities, or even non-musicians, to produce complex compositions. The disadvantage is that it is time-consuming.

Real-time multi-track MIDI sequencing packages (often with a built-in step-time system) are now available for most popular computers. Prices range upwards from around £50 (for Cheetah's software and interface package for the Spectrum) to £500 or more for sophisticated packages aimed at the professional musician.

One of the most prolific producers of MIDI software and interfaces, Electromusic Research, has packages for the Spectrum, BBC, Commodore 64/128, MSX, and Amstrad's CPC and PCW computers. It is also planning packages for IBM PC compatibles as well as the Atari ST series. Other suppliers include Joreth and Datel (for the Commodore 64/128),

"Midi is no longer confined to the keyboard-playing musician . . ."

DHCP Electronics (for the Amstrad PCW), and XRI (for the Spectrum).

All computers require a hardware interface if they are to be used in a MIDI system – with two notable exceptions. These are Yamaha's CX5 MSX machine, recently withdrawn from the market, which incoporated MIDI ports and a sound synthesizer, and Atari's ST series.

Because of its built-in MIDI ports, and for several other reasons including its large memory, high resolution display and relatively low cost, the Atari ST has established itself as the most popular computer for musicians. Although some other machines, especially the Apple Macintosh and the Commodore 64/128, have attracted a fair amount of MIDI software, the ST has, in the last year, become the favourite tool of MIDI software writers with more than a score of sequencers already written for it.

The ST has also attracted a good crop of the second type of MIDI software package, the synthesizer voice editor and librarian. These programs are intended to ease the time-consuming and often confusing task of programming new sounds for synthesizers.

PARAMETERS

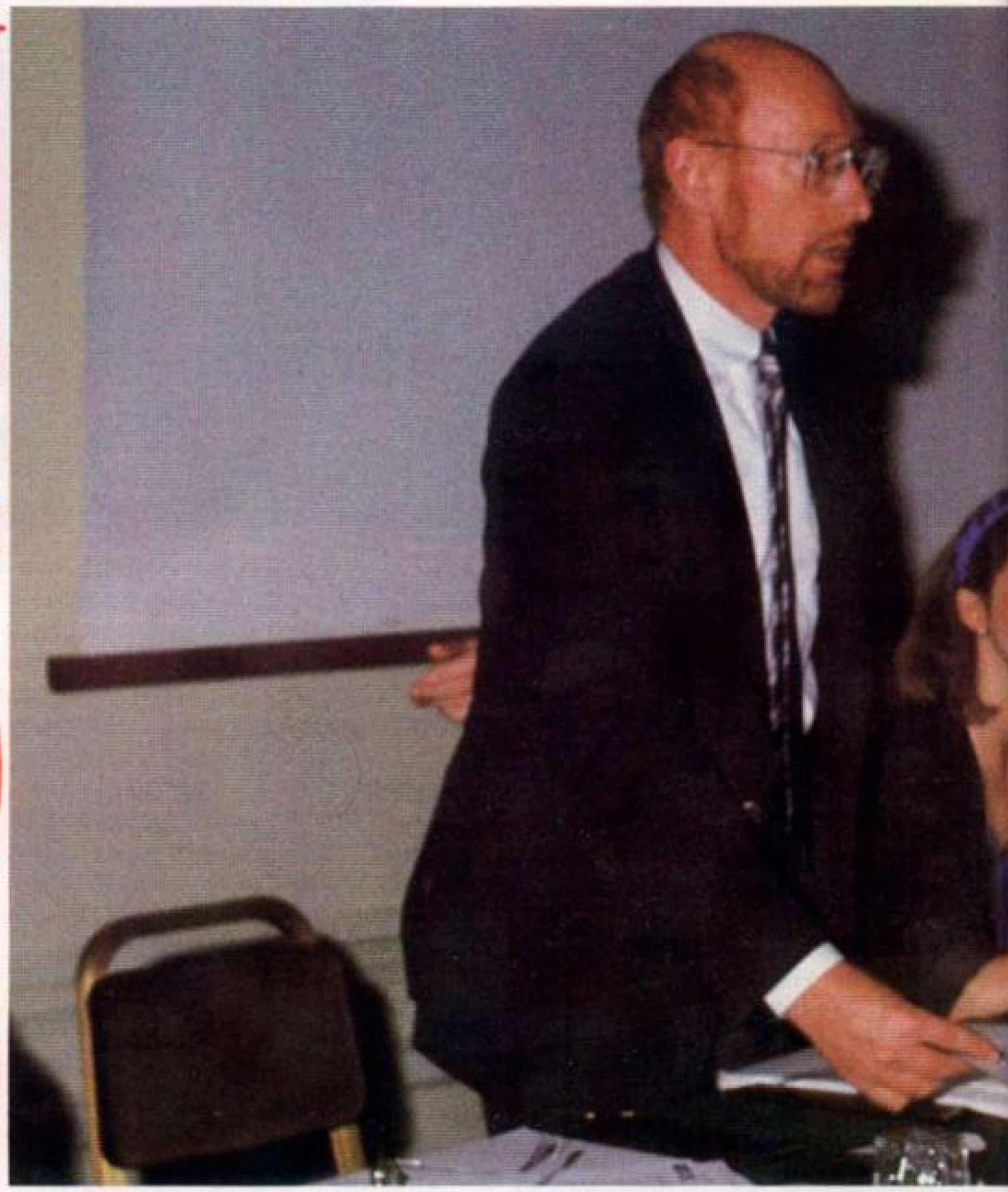
Many synthesizers need more than 100 interacting parameters to be defined to create a new "voice" or sound, but the tiny displays on most synthesizers allow only a few of these parameters to be seen and altered at a time. Using a computer allows all the parameters to be shown simultaneously on the screen, often with graphic representations to ease the programming process. The parameter values can be altered from the QWERTY keyboard and then fed to the synthesizer via a MIDI link. Collections of voice parameters can be stored on disk for subsequent transfer to a synthesizer.

A similar, and perhaps even more vital, use of micros for the electronic musician is in editing sampled sounds for dedicated sampling instruments. Sample data can be transferred from a sampler to a computer via MIDI and displayed on its screen as a waveform which can then be altered to remove any unwanted sections or to repeat chosen sections. Without this visual assistance, editing samples can be a hit-and-miss affair.

New applications are emerging for MIDI all the time. It can be used to change stage lighting levels, to select effects such as reverberation or echoes, and even to control the sound mixers which adjust the relative volumes of different instruments. MIDI is no longer confined to the keyboard-playing musician as there are now several MIDI-equipped guitars and recently these have been joined by MIDI devices designed to be played like wind and brass instruments.

As a newcomer to micro-based music-making you are unlikely to plunge immediately into the murky depths of MIDI. But if the simpler and less costly options outlined above whet your appetite, you will probably end up doing so eventually. You won't regret it.

Back to the FUTURE



● **Above: When Sir Clive makes an announcement, the world still listens.**

With the Z88 released to some acclaim, Sir Clive Sinclair is back in business, plotting the future of computer technology. As usual, he is miles ahead of everyone else. But is he too far ahead for his own good?

Sir Clive Sinclair is indisputably the most colourful and influential figure on the British microcomputing scene. Martin Banks and Simon Craven caught up with him at the official launch of the Z88 laptop computer. The Z88 is interesting in itself, but Sir Clive also gave away some fascinating details of how he sees the future of Cambridge Computer, the pocket telephone and the potentially revolutionary wafer-scale integration project.

Why is there no modem fitted to the Z88?

"It's coming along as an accessory, but the problem is that it needs to be a different unit for each country we sell in. In this country there is also a delay for BT approval."

What about comms software?

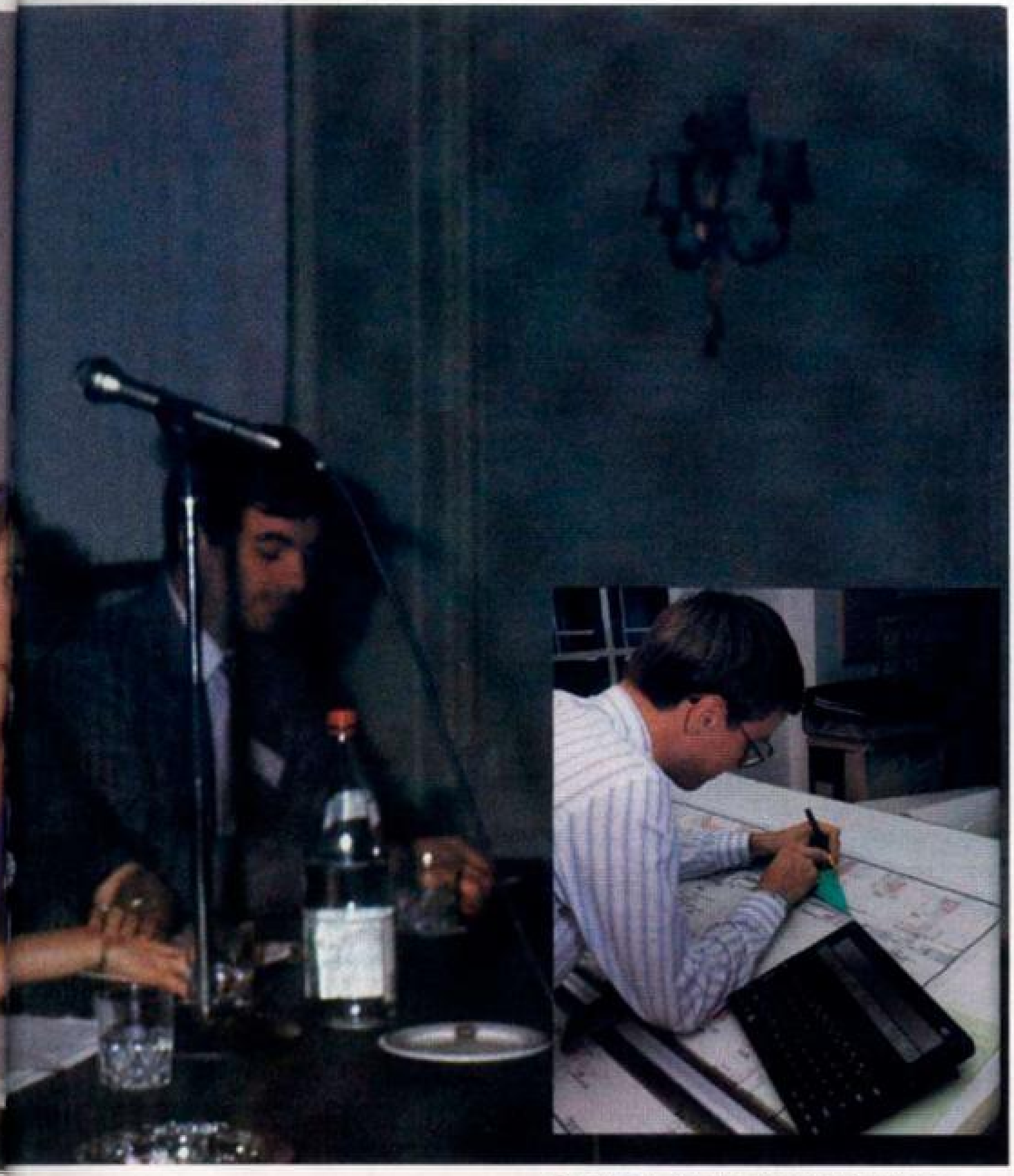
"There is some comms software already built into the machine. That gives you enough to log on to something like Telecom Gold. If anything else is needed in the future it can always be loaded into the machine where it will stay resident even when the Z88 is switched off."

Earlier computers from the Sinclair design stable have sometimes been accused of poor reliability, and Cambridge Computer's publicity effort is placing heavy emphasis on the quality of design and construction in the Z88. Has there been a significant return rate on the computers delivered so far?

"No we had a few back, about six, with a keyboard problem in the early stages, but that's all the trouble we've had.

You have announced distribution deals with Dixons and Comet. Will these be the only outlets now that you have stopped mail order sales?

"No. The general trade will be served by other distributors. I can't name any at the moment, but we are in negotiation



● Inset: A number of applications have already been discovered for the Z88.

with several and expect to appoint at least two."

Cambridge Computer sells software to transfer files between the Z88 to the IBM PC. At the moment, Wordstar and Lotus 1-2-3 are supported. Are there plans to implement file transfer to other software or hardware environments?

"Yes, a Macintosh package is under way, and as for others we'll look at them in the light of demand from our customers. It's worth remembering that there will be a healthy market for third-party manufacturers of add-on software and hardware for the Z88. A third-party communications pack for Z88 to BBC micro is one example which should appear shortly."

We've heard that someone is working on an Amstrad-Z88 pack, too.

"Which is fine. That's the sort of thing we are happy to encourage."

One possible application for the Z88 is data capture. Do you have a suitable bar-code reader?

"Not ourselves, but that's certainly the sort of product which we envisage being plugged into it. A lot of that sort of thing will come from other companies – we have no wish to monopolise the market."

The machine uses EPROM cartridges for mass storage. With conventional disks one advantage you have is that you can carry out a selective random-access purge to clear out your unwanted files. With the Z88 cartridge you can only erase the whole content at once.

"Yes, but that's not a problem because you use it in a different way. You take an EPROM with a lot of stuff on it, put it into the machine, dump the whole lot to RAM, delete the files you don't want, wipe the cartridge and save it all out again. The wipe process only takes about 12 seconds, which is pretty fast for EPROM. When you get up to a megabyte on a cartridge we are going to use PROMs which you can't erase yourself, though you can send them back to us to be wiped. The reason is that we expect people to use the megabyte cartridge like a hard disk. It is essentially for long-term archival use. People don't generally delete things from their hard disks – they just dump things to them."

> *". . . we see the Z88 as being sufficient as far into the future as we can see . . ."*

Will you limit the future capacity of the cartridges to 1MB? If not, how will you manage the directory problem?

"We don't need to limit the capacity. The current 1MB cartridges have a 1MB direct addressing range. There's no reason why you shouldn't have more than 1MB in there, but as with a hard disk, you will have to tell the machine which page you want to look at."

Cambridge Computer is at present a single-product company. Will there be other Cambridge Computer systems in the future?

"Very much so. Not other portables, because we see the Z88 as being sufficient for as far into the future as we can see, because it's flexible and you can add things to it. But we are looking at the computer field in general to see what else we can do."

Cambridge Computer seems to have a very different character from Sinclair Research, in its target user base at least. The intended user of this machine is very different from the buyer of a ZX80, ZX81 or Spectrum.

"In a way, yes. The original idea behind the ZX80, 81 and Spectrum series was to get into the idea of teaching people about computers and what they could do. We realised the games thing would happen, but we never expected it to take over, which it did. We didn't plan that at all. It became the dominant side of the business, but what we had always wanted to do was get into the business of making usable computers which would help people. That's what we have done with the Z88, so in that respect it is an expression of where Sinclair Research was going. Now we've reorganised ourselves so that Sinclair Research is purely a holding and research organisation and Cambridge Computer actually handles the products."

How much of the concept of the Pandora project is carried over to the Z88?

"Well, the basic philosophy is very similar, but when it came to the design we started from scratch with a clean sheet of paper. It was lucky we had that opportunity, because we were running up against a brick wall at that point. The display technology on Pandora was a flat screen similar in concept to the pocket television, with an optical system to blow it up to a decent size. It was very good, but it couldn't quite give us a display 80 characters wide. We went up to about 66

characters but couldn't do any better. We were just lucky that the supertwist LCD technology came along when it did."

Is it possible that some of that abortive flat screen technology might spill over into a third version of the pocket television set?

"No, we have no plans in that direction at the moment. I'd like to do a new pocket TV but the fact is that it has not proved to be a big market."

Why do you think that is?

"It's very odd. Pocket radios have always been big sellers, but pocket TVs have not. I can only suggest that watching television is not something that people do on the move."

Maybe because it's more interactive, diverts more of your attention?

"Possibly, but it certainly isn't a big market."

What are your hopes for your telephone project?

"Shaye Communications has a 25 per cent stake in that project, and the product should be out next year. It's a dramatic breakthrough, but that's about all I can say at the moment."

We understand that the real success of that product will be dependent on the siting of terminal stations at places like railway stations, airports and the like.

"That's one way of going, but you can use it through a black box which connects it to your office switchboard, or through a different black box which connects it to cellular radio. you have a little pocket phone, smaller than your little dictation machine there, weighing about three ounces. you are then free to buy the interfacing black boxes. One connects to the office PABX. Everyone in the office has the little handsets and they can use them just like ordinary telephones. They can call each other or dial out of the building without even thinking about it. You could then have another black box in your car which enables you to dial out from there on the cellular system. You use the same telephone, without having to think about where you are and what system you should use. When you get home you can keep on using the same phone because you have a black box in your house. So wherever you are you use the same phone in exactly the same way, and it automatically polls around the available black boxes to place the call as cheaply as possible. It's completely user-transparent."

How many calls can one of your black boxes handle at any one time?

"A lot. It's about 100, all time-sliced."

That's a good number when you think of the queues at railway station telephone boxes. Will it have a significant cost advantage over existing cellular phones?

"The phone itself is considerably cheaper, but it doesn't do the same job. If you bought the cellular black box as well, the cost would work out about the same as a conventional unit. There's no reason for it to be much cheaper."

What is the latest news on your wafer-scale integration project?

"It's going very well. That company, Anamartic, should be announcing its capitalisation soon and we expect to see products out next year."

What process are you using?

"The first wafers, the ones due out late next year, will be CMOS, but we are working on our own process which should appear in two to three years' time. That will be bipolar technology, which is a very dramatic change. I worked out some years ago that you had to go bipolar, and the world is now starting to realise that. Bipolar CMOS is starting to appear, but what it really takes is true bipolar design. There are fundamental theoretical reasons why bipolar is better. What really matters is how much voltage you have to put into a transistor to switch the capacitors. A bipolar transistor is ten or twenty times better in that respect."

How long does the initialisation process take when the wafer is powered up? Ivor Catt's designs back in 1978 had serial registers, and they were doing a three-cornered search for valid memory.

"It's the same principle. They are blocks of RAM instead of serial memories and they do a three-cornered search. It takes a tiny amount of time to initialise – less than one second to map out the wafer. And whereas Ivor's original idea was to power up the wafer every time you used it, we don't do that. We initialise it once and then it stays live. You could power up again if you ever had a failure – there's a detection process – but we built in two additional levels of redundancy over and above the original Catt concept. There's an error code correction and a system whereby you can use a partial block. If one of the blocks of RAM doesn't work completely you can still use it. It maps the faults and works around them, just like a disk formatting program. So the chance of a significant failure is very low. I've forgotten the mean time between failures but it's huge. That's one reason we're going to sell them. The speed is terrific, of course, but the reliability factor is very important."

"I worked out some years ago that you had to go bipolar . . ."



● **Is it the ghost of the past or the ghost of the futur which ap**

In the long term are you thinking of other types of memory, such as EPROM?

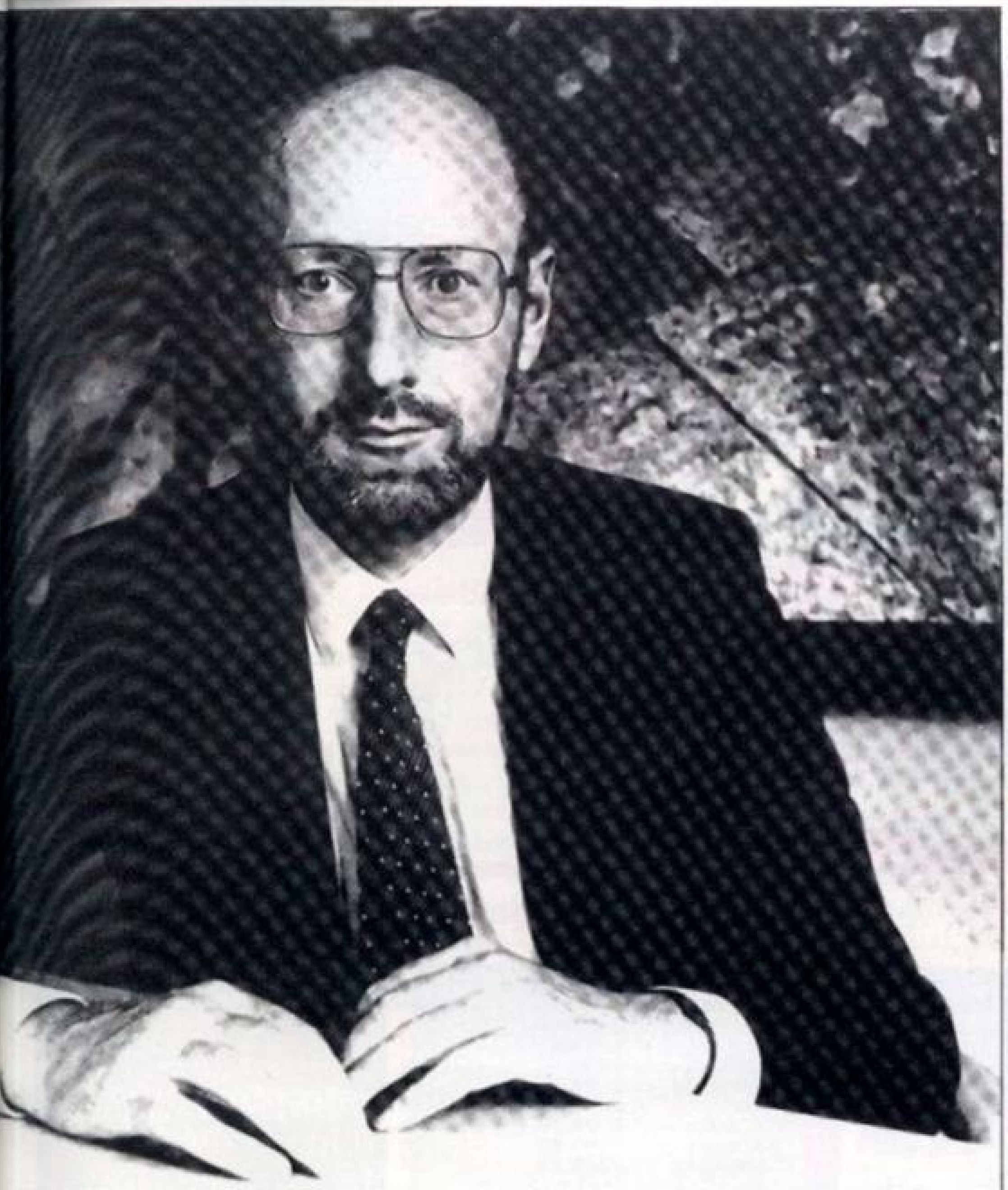
"I don't know how much thought Anamartic has given to that, but I am very much interested in other sorts of memory. EPROM excites me because it requires zero power when the computer is switched off, whereas for the RAM we have to use battery back-up."

You have always had an interest in alternatives to standard media such as disks, and the idea of a nice convenient cartridge with ten or twenty megabytes of capacity is obviously attractive.

"Yes, I think solid state has to dominate. I have never believed that disks were the best way to go. For a long time, of course, they were the only possible way to go."

But so far disk technology has always managed to beat semiconductor technology. A few years ago bubble memory was supposed to be the great disk replacement, but that didn't make it.

"So far, yes, but that has changed now. The Z88 is an example of a machine



which appears to haunt Sir Clive?

which has no need at all for disks. I can't mention any names, but one of the big computer companies has a stake in Anamartic, and the reason is that they are going to change over from disk to semiconductor storage.

Is that Tandon?

"I'm not allowed to tell you. But there is no doubt whatsoever in my mind that the whole computer world will change over – not overnight, but it will happen."

How long do you expect it to take?

"Some years. It depends on need and on who is doing it, but faster than you might suppose."

Presumably this technology has a bearing on the future of the Z88.

"Sure, it means that eventually we will be able to have multi-megabyte cartridges using only one chip. At the moment we have six-inch wafers under development, but they are designed so that they can be cut down into whatever size of package we want."

What is the likely cost of a wafer memory?

"At first it will be several times the cost of the equivalent Winchester storage, but it will decline faster than the per-bit cost of the hard disk. Of course, it will always have a big advantage in performance – wafer scale memory is about a thousand times faster in terms of access time."

Everyone else in the semiconductor industry seems to have discarded the idea of wafer scale integration. What have you got that they haven't?

"The difference is that they have had a hardware approach to the problem. They were trying to use fuses, or antifuses, to link the bits. That's a desperately bad idea, because if you make one slip you've had it. Ivor Catt, and him alone, decided to do it with software, using a soft interconnect and the three-cornered search to see which bits are usable. It's taken a huge amount of effort to make it work, but Ivor is marvellous. He is a classic inventor. Now we have other companies coming in, the big companies who don't take an interest unless it works."

"Wafer scale integration is fundamental. It's not an option – it's a necessity."

Do you envisage applications for wafer-scale integration outside the field of memory?

"I started the whole thing because I want that technology for supercomputers, and that's what I'm still interested in. Obviously we will use it for memory; so will everyone. But that's not why I started it and that's not what excites me."

What excites you? The idea of a wafer full of transputers?

"Absolutely. Real array processing. Years ago I was in the States and I realised the future of computing had to be parallel processing. I had one of those brainstorms we all have and thought 'Christ, we'll never do it! The pin-out problem alone will kill it'. Wafer scale integration is fundamental. it's not an option – it's a necessity. So I came back and started it, got hold of Ivor Catt and started the whole process."

So that's the long term goal for Sinclair Research and Cambridge Computer. A Cray on a desktop.

"Absolutely. That's the real stepping-stone."

Martin Banks adds:

The thing that strikes me about Sir Clive is that he can actually see far too clearly, far too far into the future. And he's dead right. Disk technology is getting horrifyingly anachronistic. The mechanical technology of a hard disk drive is fearsome. I take my hat off to disk drive manufacturers that they can make it work at all, never mind reliably. But it's going to be around for years and years because there are so many people using it. He's absolutely right, but it wouldn't surprise me if it takes until the turn of the century for him to be proved right. I would like to see it happen much sooner, because non-mechanical mass-storage has to be the way to go.



FRONT DESK

AMT sports new computer

Cricklewood's finest computer company, Applied Microsystems Technology Limited, has launched a portable PC. Known as the PC Sport Plus, it features 256K of conventional memory expandable to 640K. An additional 512K of expanded memory can be added on a separate memory bank to allow extra room for packages such as Lotus 1-2-3 and Framework.

Running at a speed of 8MHz, weighing only 10lbs. and carrying the normal facilities such as two serial RS232 ports, 25 pin and 9 pin and optional EGA card, the computer seems worth a look, especially as it costs £499 plus VAT. Adding DOS 3.2, 640K of RAM and a monochrome monitor takes the price up to £703 plus VAT.

Integrated 7 takes itself up a notch

The *Integrated 7* integrated package by Neric Automation has been upgraded in several departments. The most notable improvements are in the spreadsheet component, *The Twin*, now made to emulate Lotus 1-2-3. It has the advantage of being written in C rather than assembler code and this should make it easier to update.

Integrated 7 still costs £99.99 plus VAT and also features a word processor, a database, a graphics component, a mailmerge-type option, terminal emulation and communications.

Amstrad PCW screen filter

Now available for the Amstrad PCW at £14.50 is a screen filter from Visual Display Technology. VDT claims that it makes text appear truly as green-on-black instead of the less distinct green-on-grey.

The filters are made from a neutral grey polycarbonate and are contoured to fit the VDU screen. Glare is reduced by a matt coating applied to the front surface.

They can be ordered directly from the manufacturer (include 50p for postage and packaging) at 450 Oakleigh Road North, London N20. Tel: 01-368 9555/9666.

If you can't stand the heat, get the computer out of the kitchen



Those of you whose computer monitor clutters up the kitchen table and keyboard doubles as a chopping board may well be interested in a range of furniture manufactured by Lancelot. Called *database* and accompanied by the snappy slogan, 'computer furniture makes sense', the modular system consists of a desk unit, a filing trolley, a printer unit and a corner link unit.

The heart of the system is the cantilever desk. It boasts a free-standing monitor unit, drawer and shelf and costs £72 with a rosewood finish or £65.20 with a black finish.

The printer stand features a paper shelf and a paper feed slot, not to mention a paper collection wire basket to receive paper from the printer. This unit costs £58 with rosewood finish and £54 with black finish. The collection is completed by a filing trolley at £26.40 and a corner link unit which costs £13.

Excel serves up a new menu

MenuDOS from Excel Computer Systems combines menu-making facilities with DOS assistance in one package. The £47 package comprises two programs, MenuMATE and DOSMATE. The latter organises files into a directory hierarchy from which programs and data can be accessed directly via MenuMATE.

Major features of the package include up to 10 nested menus, up to 24 options per screen, automatic load on start-up, reverse video cursor selection, password protection and an Are You Sure? message.

● Up to 10 nested menus are available on Menu-DOS



A PLOD FORWARD

AFTER TWO YEARS THE MASSIVELY SUCCESSFUL AMSTRAD PCW 8256 HAS BEEN SUPERSEDED BY THE 9512. IAN ROOK REPORTS.



More than a word processor for less than a typewriter, the Amstrad PCW 8256 has been bought by a variety of people. Professionals who would previously have bought a typewriter now own a computer. Those customers often want something slightly different from the machine a computer addict would expect. Why should anyone buy a monochrome CP/M computer in 1987? Because they have a job to do. The PCW 8256 met the requirements of hundreds of thousands of users but not everyone. Now the PCW 9512 has been launched to answer the major criticisms levelled at the two-year-old machine.

The new word processor looks more like a PC and has a better keyboard. Its case is riddled with cooling holes of the type found on the 8512. With a smaller footprint than the 8256, the 9512 is much more executive. The size advantage is lost when you look at the other box in the packing case. The keyboard feels better because the keytops are larger but the mechanism is the same.

The major PCW 9512 improvement is the printer. Although its design is not so smart as that of the system unit, the emphasis is on quality. It is a slowish daisywheel, something less than 20cps, on a par with the NLQ speed of the 8256. From CP/M it uses Diablo 630 protocols and takes the same printwheels as the Diablo. There are 173 wheels available so you should find one to suit your needs unless you speak Welsh or Esperanto. If you are desperate, a number of firms manufacture custom daisywheels. With the introduction of the 9512 I would expect some enterprising firm to rush into manufacture with a host of new designs.

price, speed, quality and noise. The 9512 printer is slow but cheap and noisy but provides excellent quality. In a fit of marketing exuberance, Amstrad refers to this as Perfect Letter Quality. A disadvantage of this quality is that daisywheels cannot dump screens or draw lines. Anyone who tells you that it is practicable to draw graphics by using the full stop on a daisywheel and feeding the paper back and forth either has more spare time than is morally right or has never tried the exercise.

With the PCW 8256 you had to buy an interface before you could attach a better printer. The 9512 has a Centronics printer interface as standard. It will allow you to connect anything from the cheapest dot matrix to expensive laser printers. You can still add the CPS interface – you will need to if you want to use a modem.

It acts as both a serial interface and a second Centronics port. It is possible to have four printers running at once, although somewhat noisy. The 9512 printer is connected to the system unit by a round cable. It is longer than the 8256 ribbon cable and allows the printer to be placed on either side. The print area is more than 30cm. wide, allowing plenty of room for spreadsheets to be printed-out. You can easily fit an A4 into the printer side-on. That means that despite the lack of a condensed mode which is available only on dot matrix printers, you can still fit large tables on a page.

Screen

Other improvements in the 9512 design include a black and white screen, as opposed to the old down-market green screen. Amstrad refers to it as being a paper white monitor. In this case it means bright white text on a black background. The tube is similar to the one used in the PC1512 mono display; the bulk buying costs no doubt help to make the magic sub-£500 price possible. For those who have been spoiled by £700 monitors on £4,000 computers the display seems poor; compared to any other budget system it is excellent. The resolution is higher than that of a Macintosh, IBM or Atari ST with a horizontal resolution of 720 and a vertical resolution of 256 pixels.

The final hardware improvement is the high-capacity disk drive. The PCW 8256 has a single 180K drive, the PCW 8512 has both an 180K and a 720K drive. The 9512 has just a 720K first drive. A second 720K drive can be added, making this potentially the largest capacity machine.

Fitting is very difficult; it requires the monitor tube to be removed, a job best tackled by a service engineer. With the 512K of RAM having more than 360K allocated as a RAM disk, the single 720K drive is more than adequate for word processing. The usual rule of thumb is that a page of text uses 4K. That would allow for 180 pages per disk. The 9512 can read the old 180K disks but not write to them. You may experience some problems with protected games disks if they use a funny format. I am assured that *Starglider* runs perfectly.

The PCW 9512 uses *LocoScript II*, complete with *LocoMail II* and *LocoSpell II*. They have been available for the 8256 for some time. The combined package would cost £100. The machine also has CP/M plus, Mallard Basic and Dr Logo. Both LocoScript and CP/M have been updated. The review machine included LocoScript II version 2.10, although final machines may be shipped with 2.11. The software has been produced by Locomotive Systems Ltd, a company indepen-



● The major PCW 9512 improvement is the printer.

dent of Amstrad but associated very closely with it since the early days of Amstrad computers.

LocoScript is a progression from the Diamond word processor, a £10,000 system used by large companies and Government departments. It offered a wide variety of word processing functions but its price kept the user base small. When Alan Sugar brought down the price to the man-in-the-street type levels the experience the men at Locomotive had gained on Diamond was put to good use.

Letter

Designed initially to be easy to use, a computer naive typist should be able to produce a sample letter in the first half-hour. The program uses a system of menus and windows, although there are no icons or graphics. Everything is in a logical place, although your idea of logical and the ideas of Locomotive may not always coincide.

By using the menus you can set up a wide variety of standard layouts, called templates. They allow for headers and footers, page numbering, indentation and wide degree of text manipulation. Because the software knows what printer you have, it can adjust the column width and spacings to fit. If you have a non-standard printer fitted you will need to install a custom driver. Thousands of people now understand how to use LocoScript and there are numerous tapes, books, videos and courses to help you if you find the manual too difficult.

LocoScript II has taken the original software and improved on it. The major problem was speed. LocoScript took a time to get through the text if you wanted to move from the beginning to the end. LocoScript II is not instant but shows something in excess of a two-fold increase. LocoScript II also allows for a wider variety of characters, although on the 9512 you are restricted to the daisywheels which are available, case-specific search and replace, disk utilities and multiple copy printing.

LocoSpell is a 78,000-word spell-checker. It benefits from the large 9512 disks; 8256 owners have to suffer a reduced dictionary. The words are all English, as opposed to American, the list being based on the Chambers 20th Century dictionary. If LocoSpell does not recognise a word it will guess, giving you a list with spellings which are close. You can ignore the complaint, teach LocoSpell the new word or accept one of the suggestions. As you use LocoSpell you will build a personal dictionary, called USERSPEL.DCT. It can be copied from disk to disk and means that you spend less time correcting texts.

LocoMail is a very advanced mailing program. It does more than insert text blindly from a mailing list into a letter and print it out a number of times. LocoMail can be set up to examine the text and decide which paragraphs to include – begging letters only to be sent to debtors, mathematical functions performed and an end to "Dear Sir or Madam" introductions. The penalty for that flexibility is that LocoMail is very complicated to set up. it is more than a day's work to get a simple mailing list running and several days are needed to master the program.

Package of three

As a package of three programs they work very well. Many 9512 owners will not buy extra software, although CP/M is there if they want to do so. My copy of *Protext*, a faster third-party word processor, performed just as well on the 9512.

Only a few people will use Mallard Basic. It is a fast MicroSoft Basic-type language with random access file handling. It does not support graphics but mathematically is very accurate and ideal for small business applications. Dr Logo is a supposedly educational language. It only goes to show that educationalists do not live in the real world and that they live in ivory towers talking through hats. Anyone who wants to program in Logo also wants colour, so it seems odd to include it with the PCW.

The bugbear of the 8256 was its manual. The machine sold to such a computer illiterate clientele that much of the manual went over the readers' heads. If Amstrad is good at one thing, it is learning from mistakes. The 9512 manual has been re-written extensively. It is easier to read and more methodical but it is badly bound. The 9512 manual is a reference work. It should have been two ringbound manuals, one for CP/M and one for LocoScript. The supplied manual smacks of penny-pinching and will make the machine more difficult to use.

Overall, the 9512 is a typical Amstrad step – a plod forward. There are no great advantages, the printer is not the 24-pin one for which we had all hoped. The software is more refined and the system looks better. It will not set the computer world alight but it will ensure that Sugar stays a very rich man.

ATARI The leading North West Specialist ATARI Dealer

LADBROKE COMPUTING INTERNATIONAL

33, Ormskirk Road
Preston, Lancs.
Tel: (0772) 21474
Mail Order: 27236 or
Bul/Board 6pm to 9am

ATARI

This Company has given years of full support to ATARI users Countrywide from their retail shop premises at Ormskirk Road, Preston. Now from their NEW Mail Order Depot they can offer the same Excellent service to all Mail Order Customers.
All Software and Hardware is fully tested prior to selling. This ensures Customers receive working items so that returned goods, and all the attendant frustration are a thing of the past. All Hardware is supported by our own 'ON SITE' engineers, therefore quick turn round on all repairs is Guaranteed. All prices quoted are fully VAT inc. and there are no 'hidden extras', what you see is what you get. Prices include delivery. Phone for latest Prices/Releases.

520STM Packages......................PHONE



1040STF+Mouse
+Softwr......................£480.00
1040STF+Mouse
+Hi-Res Mon
+Softwr......................£580.00
1040STF+Mouse
+Colour Mon
+Softwr......................£780.00

1Meg Upgrades are available for the 520STM. These are our own design and are very simple to fit.
Using the same board, all ST's can be Upgraded to 2mg or 4mg. So no need to sell your 520 just Upgrade to a Mega ST using our board.

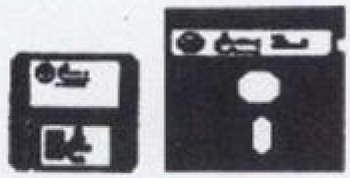
1Meg Upgrade (STFM)................£70.00
1Meg Upgrade (All ST's)+Board £150.00
Upgrade Boards.........................£120.00
2.5Meg Upgrade +Board.............PHONE
4Meg Upgrade +Board................PHONE

If any of the above Upgrades are purchased with Hardware then deduct £5 from total.

All Hard Disks come with Utilities to cure the 40 Folder problem + Backup Utilities, Fast Read Write etc.

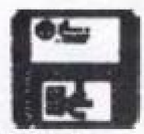
PRINTERS

Dot Matrix
Star NL10...............................£230.00
NL10 Sheetfeeder.......................£55.00
National Panasonic....................PHONE
MP165.......................................PHONE
MP135.......................................PHONE
LX86 Tractor Feed.....................£19.00
LX86 Sheetfeeder.......................£55.00
LQ800 24pin D/M.....................£525.00
All Others..................................PHONE



	3½ D/S D/D	5¼ D/S D/D 46TPI
Per Disk	£1.99	£0.80
10 Disks	£16.00	£6.50
10 Disks+Plastic lib case	£17.50	£7.50
100 Disks +Cases	£150.00	£60.00
500 Disks +Cases	£650.00	£280.00

All Disks are covered by an unconditional lifetime guarantee.



We also stock a full range of quality P/D ST Software at £3.99 per Disk Send SAE for catalogue.



Our ATARI trained engineers will repair all Hardware in minimum time at competitive rates. Please ring for a quotation. All repairs carry a 90 day warranty.

NEWLY IMPORTED

Imager. Easily fixed to your printer it will digitise anything placed in the printer and save to Disk to be used with Dega, Elite etc. RRP £99.99.

All Printers, Disk Drives etc supplied with cables etc. NO HIDDEN EXTRAS

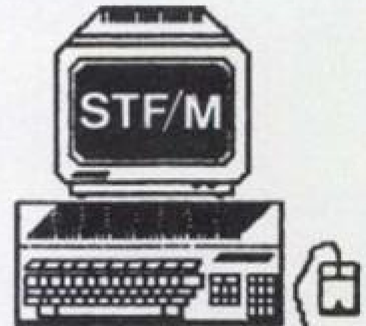
Mega ST's......................................PHONE
Lazer Printers...............................PHONE
PC Clones.....................................PHONE

DUST COVERS

Computers.......................................£3.99
Monitors..£4.99
Disk Drives......................................£2.99
Printers..£7.99

IF IT'S AVAILABLE we have it! Send SAE for full catalogue.

All Dedicated books and mags in stock



520STFM+Mouse
+Softwr.....................£285.00
520STFM+Mouse
+Softwr
+1Meg Upgrade.........£350.00
520STFM Mega Pack
520STFM+Mouse
+Softwr
+1Meg Upgrade
+1Meg 2nd Drive.......£485.00
Equal to 1040STF+½Meg Drive
+Modulator

For Med Res Col Mon add........£299.00
For High Res Mono Mon add....£129.00

All Hardware is covered for 12 months by our service dept. and is tested prior to delivery to assure satisfaction.



We have a complete range of Software in stock and fully tested.

We also stock a full range of ATARI 8Bit Hardware and Software including the new XE range. Please ring for prices

PERIPHERALS

Triangle 1mg D/Drive..............£139.00
Triangle 2x1mg D/Drive..........£229.00
Pro Draw Graphics Tab'..........£299.00
Cumana 1Meg D/Drive   £139.00
All Drives come complete with Software

HARD DRIVES

Atari 20mg.................................£560.00
Triangle 20mg Hard Disk.........£575.00
Supra 20mg................................£550.00
30Meg (Cumana).........................£699.00
40Meg (Triangle).......................£799.00

Any Software problems? Queries? give us a ring we usually have the answer

TO ORDER Simply send, or phone your order, stating Full Name, Address, Visa or Access Nos, Cheque or Money order. Make payable to Ladbroke Computing International, 33, Ormskirk Road, Preston, Lancs. PR1 2QP.

FOR MORE INFO CALL ON THE ABOVE NUMBERS OR SEND SAE AND STATE FULL REQUIREMENTS



The big event of 1987...
Atari User Christmas Show
Organised by Database Exhibitions
Champagne Suite, Novotel, Hammersmith, London W6
10am-6pm Friday November 20
10am-6pm Saturday November 21
10am-4pm Sunday November 22
The record-breaking Atari User Show is back – with three action-packed days devoted to the ever-expanding Atari market.
★ Try out the very latest UK and US 8-bit software
★ See the full ST range, including the new mega-ST
★ Snap up the never-to-be-repeated bargains
★ Expand your system with powerful new add-ons
★ Get helpful advice from Atari User's own experts
★ Experience the fascinating world of communications
... and much, much more!
This is the one show you mustn't miss!
Send for your advance tickets now – and SAVE £1 a head!
Advance ticket order
Please supply:
☐ Adult tickets at £2 (save £1) £
☐ Under-16s tickets at £1 (save £1) £
Total £
☐ Cheque enclosed made payable to Database Publications Ltd.
☐ Please debit my credit card account
Access Visa
Admission at door
£3 (adults), £2 (under 16s)
Post to: Atari User Christmas Show Tickets, Europa House, 68 Chester Road,Hazel Grove, Stockport SK7 5NY.
ATARI USER CHRISTMAS SHOW
Champagne Suite, Novotel, Hammersmith, London W6.
November 20-22, 1987
Name
Address
Signed
PHONE ORDERS: Ring Show Hotline: 061-480 0171
PRESTEL ORDERS: KEY *89, THEN 614568383
MICROLINK ORDERS: MAILBOX 72:MAG001
A150
Please quote credit card number and full address + address

LOG

CAROL ATACK RAISES HER HAT TO AN EMINENTLY USEFUL INTEGRATED PACKAGE FOR THE ST.

Home Office

TIME & MONEY

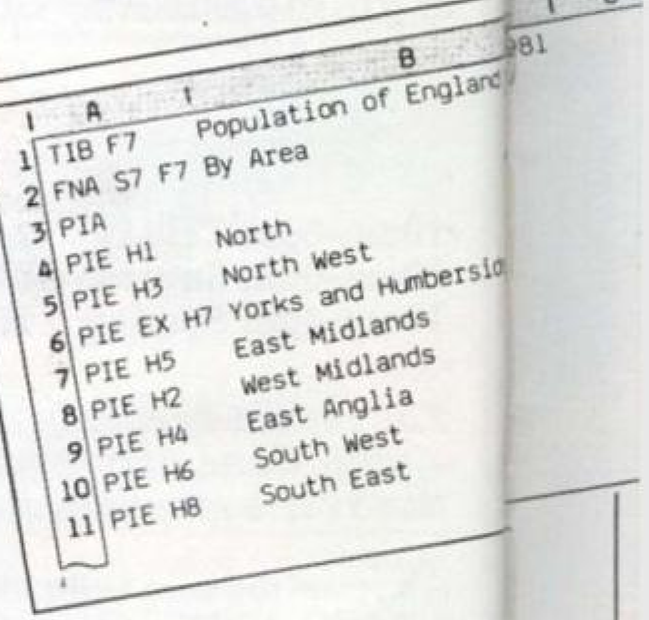
*T*he two most powerful forces in life are time and money. No one can raise a logical argument against this chilling truth, unless personal circumstances such as extreme wealth and an unhealthy disregard for mortality intervene. Even so it can be assumed that many of those who lived too fast and died too young did so at the cost of great worry to their bank managers.

The relationship between time and money is even stranger than their separate powers. We are always being told that time costs money, usually by a grinning plumber who is explaining why half an hour of his attention is worth such a large quantity of your money. Money costs time too, as those lucky enough to work for their living will tell you. Any freelance journalist will be quick to tell you that time is always on the same side as the people who owe you the money: it takes a lot of time for the average publishing company to pay out the miserly cheques you needed last week when the rent was due.

One of the first ideas computer manufacturers latched on to to sell their wares was the idea that a home computer could revolutionise your personal accounts, keep your household going and save you money by making sure that bills got paid at the optimum time. Mum could work out the housekeeping when her little darlings were glued to the joystick. Since realising that no-one keeps household accounts anyway and that the likelihood of Mum getting anywhere near the computer to do anything but switch it off, this has taken a back seat as a sales ploy.

With the advent of more sophisticated home machines such as the Atari ST, the idea of selling programs originally designed for business use into the home has been taken up eagerly by software companies wishing to expand their market base. Legions of self-employed are quite likely to own the same machines and need powerful but easily understood software to crunch their numbers or at least order their affairs into something more palatable to the accountant. For their purposes, full-scale business standard spreadsheets and databases are likely to be over-specified with too many commands to use effectively and large areas of space left unexplored.

The proliferation of low-cost integrated packages has been the result of the growth in demand for real software which works. Most is aimed at the Amstrad PC but some more far-sighted companies have made their programs available on other machines. *Logistix* combines several of the more useful business applications – spreadsheet, database and time management with graphics – and is available on the ST. It will also be one of the first business programs to be released for the Acorn machines.

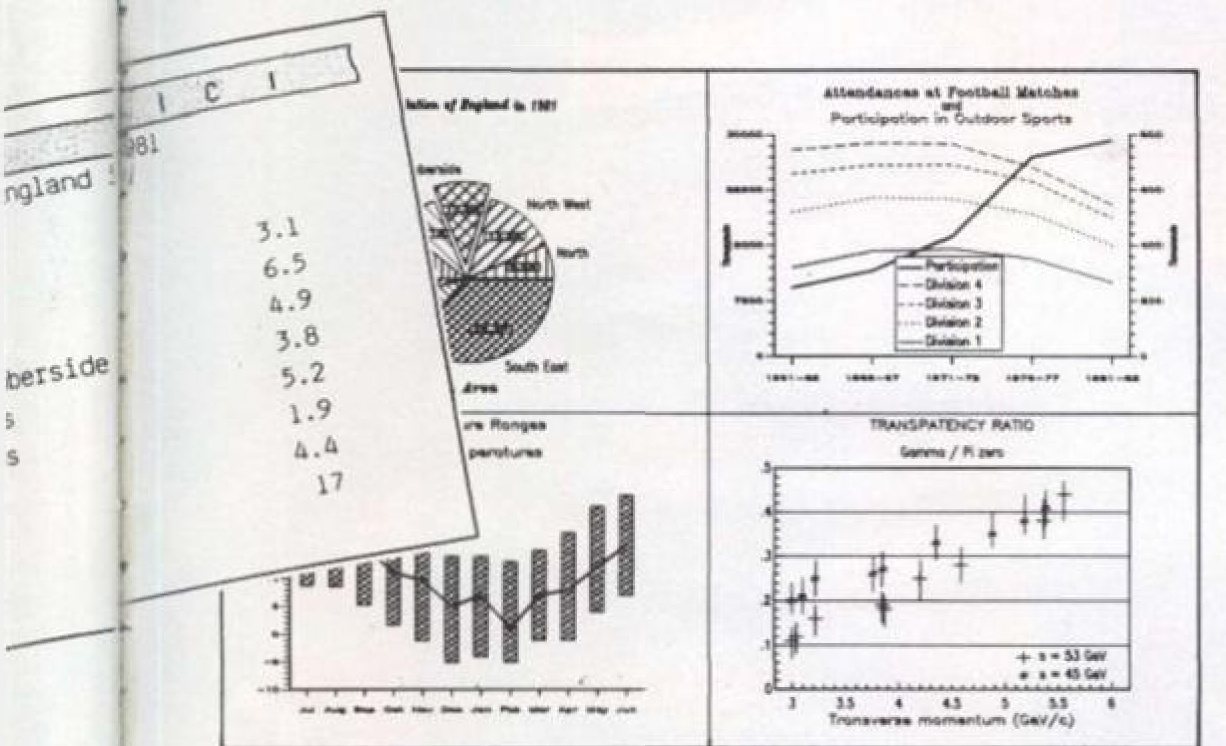


Unlike many integrated packages, Logistix mackes no concessions to the great god of popular computing, word processing. Load it in and you are confronted by an empty worksheet, or at least the top left of its vastness. This will undoubtedly be daunting if you have chosen not to read the examples disk supplied along with the program disk, which contains machine-specific loading advice, general help, a stern warning to make and use back-up copies of both disks as well as a series of thoughtfully constructed real life examples. The excellent manual is not machine-specific but as the versions which I have seen have all proved remarkably similar this is not a problem.

Following a couple of the examples through and reading the manual carefully are essential if you are unfamiliar with spreadsheets. They are not the most friendly of applications because of the necessary abstraction of the worksheet. It is important to know what you intend to achieve with each set of calculations and what each entry represents. With a worksheet of 1024 columns and 2048 rows

GISTIX

GISTIX



there is plenty of room to experiment and equally to make mistakes. Moving around the screen is best accomplished with the arrow keys, and the window can be moved with the page up/down keys, with right/left variants supplied by function keys F9 and F10. Each cell produced by the intersection of rows and columns can also be reached by entering its address on the grid. Entries can consist of an "expression" which means a number, formula or date; text (which can be repeated through a string of cells); graphics commands or a time command. Cells can be formatted to specify the number of decimal places, currency signs, and similar information.

Help

At the bottom of the screen appear the status line, which describes the current cell, showing its contents and reference, and a prompt line beneath it which indicates what actions Logistix expects you to take, such as !Recalc, Help or /Cmd (slash command). The help offered is quite discursive and written in abnormally plain English compared to many programs. It is even sometimes quite helpful. The slash commands are a selection of thoughtfully alphabetised commands which control printing, let you look at graphs you are creating and other worksheets as well as operate other imnportant Logistix functions. It seems odd that such important commands should be tucked away in such a cryptic and inaccessible menu, but at least the main work sheet is uncluttered.

Although the spreadsheet is easy to use once you have read the manual carefully, it does require a logical mind to make the best of it, and a commitment to organisation. If financial planning is to you a few scribbled figures on the back of an envelope whenever a bank statement has been more distressing than usual, it will take more than computerisation to make sense of your money. Spreadsheets are not designed to make assumptions, nor to pretend you didn't spend £50 on an unnecessary piece of clothing. However, those who make a precarious freelance living could benefit from analysing their cashflow and keeping a close eye on their finances to make sure that the taxman has not watched more carefully than they have.

Logistix scores over other packages with its time management and graphics facilities. The timesheet closely resembles the spreadsheet but is slightly less abstract, with its primary purpose clearly being project scheduling. This is most useful for small businesses where orders and cashflow can collide unpleasantly, and some jobs need to be completed before others can be started. The manual is most helpful in this section; the package is named Logistix and logistics is after all the management of time and resources against all odds. Perhaps more useful for the individual is the database facility: this is much the simplest part of Logistix to use although not as simple as the Gem-powered ST database Superbase. Up to 2047 records can be entered, and 64 different fields to sort them. Once could enter publishing companies and sort them by amount of money owed, or average time taken to pay. Records can be loaded from a dBase file, says the manual, although I suspect this might prove difficult on the ST for which neither dBase II or dBase III is available.

Graphics

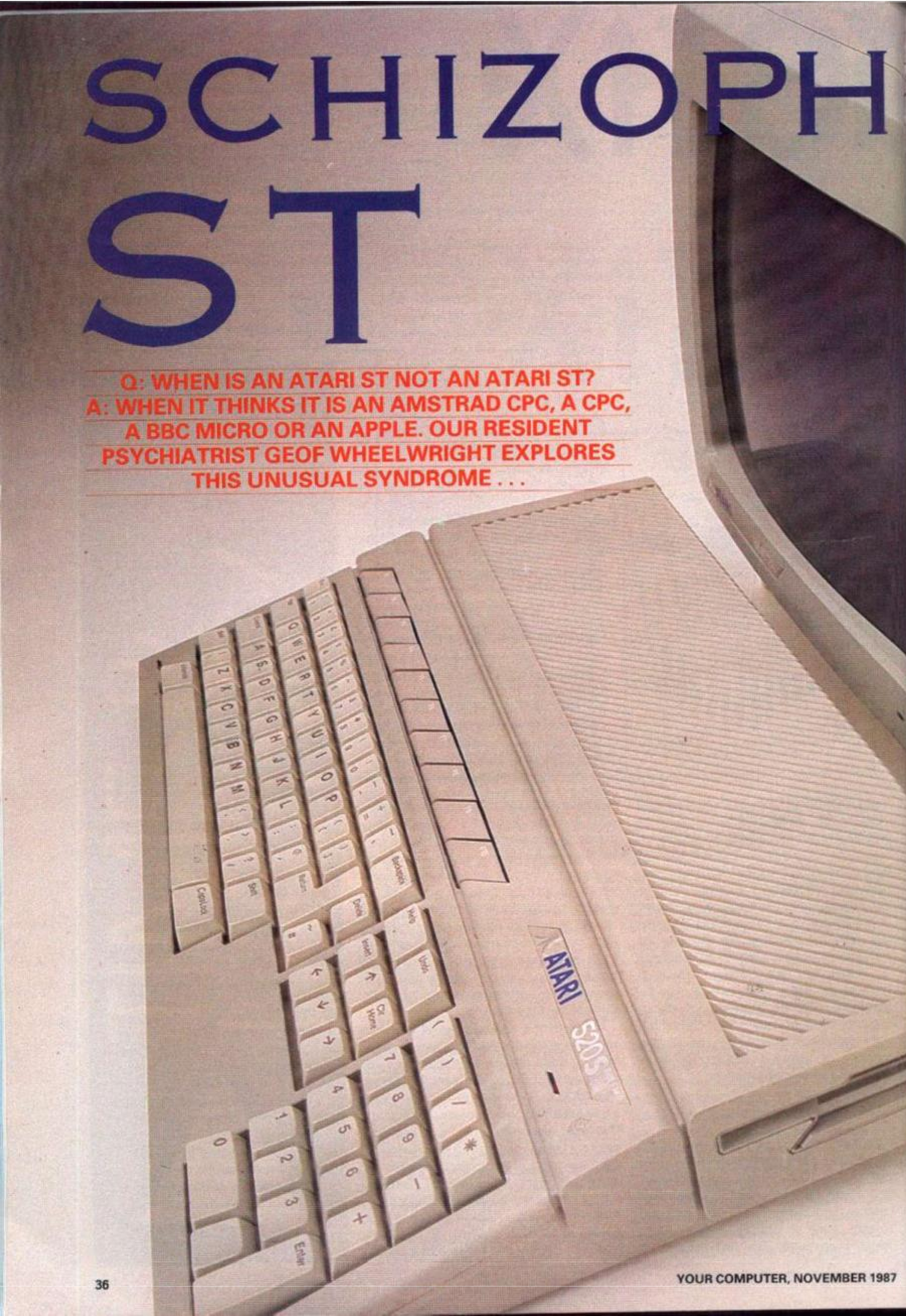
The graphics section contains all the standard forms of graphs, and although not as stunning as some of the 3D business graphics packages available at incredible expense for the PC, should be more than enough to impress anyone who needs to see your accounts. Presentation is increasingly important, even in the world of small business and, who knows, a selection of scattergrams might persuade the most hard-hearted of bank managers to extend your overdraft yet again.

If the standard range of commands is sufficient for your needs, which it should be, the facility to program macros and autos, shorthand versions of frequently used commands and entries, and combine them into what you somewhat grandly called applications, will not interest you. Persuading a programmer friend to create a standard template for your accounts could make all the difference in your use of this program, and even the manual which expects you to understand critical paths and truth values suggests that a programming pal could come in useful here.

For those interested in software and with a genuine use for this sort of program, Logistix is as good a place as any to start. It is not a toy and does require a little perseverance, but if you need Logistix you will no doubt be prepared to work at it.

SCHIZOPH
ST

Q: WHEN IS AN ATARI ST NOT AN ATARI ST?
A: WHEN IT THINKS IT IS AN AMSTRAD CPC, A CPC, A BBC MICRO OR AN APPLE. OUR RESIDENT PSYCHIATRIST GEOF WHEELWRIGHT EXPLORES THIS UNUSUAL SYNDROME . . .



HRENIC









The Atari ST (main picture) is capable of emulating a number of other computers, including (clockwise, from top left) the BBC Micro, tha PC, the Apple Macintosh and the Amstrad CPC.

They could call it the Anything Machine. It can, with varying degrees of success, act like a BBC Micro, an Apple Macintosh, an IBM PC, a CP/M machine and even an Apple II. It can also act like the Atari ST because that's what it is.

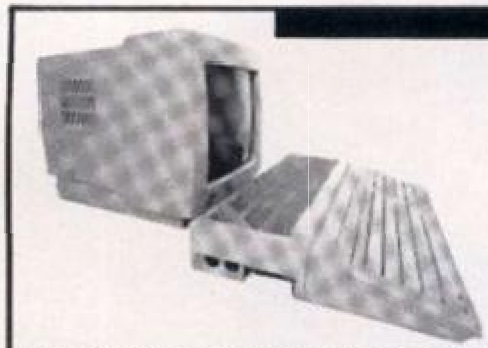
Over the past year or so, a number of powerful and complex emulation products for the ST have been developed to the point where you can quite effectively persuade it to act like at least five other machines.

This process is generally accomplished in software, where the fast processing speed of the ST's on-board 68000 is combined with its huge memory to load an emulation of another machine's firmware (ROM) and processor into the ST's memory.

In the MS-DOZ and PC Ditto IBM PC emulation packages, for example, a replica of the 8088 processor and an IBM PC ROM BIOS is loaded into the memory of the ST via a standard ST disk. You then simply stick in a standard MS-DOS disk from an IBM PS/2 or a portable PC-compatible computer and you have, after a fashion, a PC-compatible ST.

The reason we say 'after a fashion' is that an ST cannot accept PC-compatible expansion cards, nor can either of the emulators we have seen offer all the graphics modes available on a standard PC. However, on a 1040STf you do get a fair chunk of memory because the ST's 1 MB of memory is enough to assign 640K as RAM for the emulated PC. The parallel and serial ports can be used in the same fashion as they would be on a PC.

The other problem with such emulators is finding PC software on 3.5 inch disks. Although an increasing volume of this is becoming available, it is by no means common yet. For the vast majority of PC software, especially software which costs anywhere near as little as that for



the ST, you will need a 5.25 inch disk drive. Luckily, such drives are available for the ST from companies such as Cumana which also does its own brand of add-on 3.5 inch drives for the machine.

Using such an external 5.25 inch disk drive, you cannot only use a PC software emulator to run PC software directly but you can also use it to read PC data files directly in some native ST applications.

The VIP Professional spreadsheet, for example, is designed to load and save its spreadsheets in Lotus 1-2-3 format. This means that you can develop and test Lotus 1-2-3 spreadsheets on your ST at home using VIP Professional and then take that work to your office on a 5.25 inch disk and use it under Lotus 1-2-3.

And Lotus 1-2-3 isn't the only package that has been cloned in this way. There is also a clone of dBase II available for the ST – known as dBMan – which provides the ability to accept PC dBase files and write files in PC dBase format. Again, you can use a 5.25 inch disk drive to provide full swapping of data files between the two machines.

WORD-PROCESSING

And for word-processing fans, the process is even simpler as the Atari ST will accept all PC text files with no problems. This could be useful if, for example, you have an IBM PC with word-processor at work and then wish to jazz up some of that work with one of the many low-cost desktop publishing packages for the ST.

You would save your PC files as ASCII text and then import them into Publishing Partner or Mirrorsoft's Fleet Street Publisher for laying out and designing. They could then be printed on a 24-pin dot matrix printer or a laser printer for impressive, high-quality output.

The PC is not the only machine the ST can emulate. Using Robtek's Magic Sac Macintosh emulator, you can also get the ST effectively to consider itself a Macintosh.

This is not, however, a software-only solution and will rely on your having access to an Apple Macintosh and some unprotected Macintosh software (unless you wish to break copyright, this should be public domain software), along with two Macintosh ROM chips.

The most difficult part of this process is getting hold of the ROM chips. They are to be placed into the £150 container you buy from Robtek along with the Macintosh emulation software, but Apple dealers are often reluctant to part with them since Apple takes a somewhat dim view of the ST Macintosh emulator.

If, however, you can find an Apple dealer who will sell you the Macintosh chips (which are, after all, old Macintosh ROMs no longer used in current production machines) and have fitted them in the chip cartridge from Robtek, you are ready to begin using the emulator.

MAGIC SAC

You start by plugging in the Macintosh ROMs and loading the 'Magic Sac' software into the ST's memory. Having done so, you can set-up your ST as anything from a 128K Mac to an 896K Mac with either the serial or parallel ports emulating a Macintosh printer port. With the right cable, you can even use the emulator with an Apple Imagewriter.

After selecting which type of Mac you want, the emulator will run the software needed to allow the ST to talk to the Macintosh ROM chips and the emulation process begins. At this point you will be instructed to insert a Macintosh system disk to start.

This is where the fun begins. Unlike the PC emulators, the Mac emulation system does not allow you to read Mac disks directly as Apple uses variable-speed disk drives on the Mac and Atari uses standard PC-type single-speed drives on the ST.

The solution to this is a third disk format – Magic disk format. In order to start the Macintosh emulator, you must first format a blank 3.5 inch disk under this format using some of the bundled Magic utilities and then employ the Magic communications software and cable (which come with the price of the Mac emulator) to copy a Macintosh system disk from the Mac to the Magic-format ST disk.

COPY

To make a long story short, it is this disk which is used for the Macintosh system disk. To copy any further Mac software for use on the ST, the same communications procedure must be used. You cannot simply take a standard Macintosh disk and insert it in the ST, although David Small, the man who invented the Magic Sac is working on a special disk drive that will allow you to do so.

Once you get software on the ST, there are some limitations as to how it runs. You cannot, for example, use software which makes direct calls to the serial port circuitry or the sound chip in the Mac. By using 'clean' communications software such as Freeterm, however, you can still use communications functions on the Mac emulator.

A good variety of Mac software, including MacWrite, Microsoft Works (except the communications part of this integrated package) and MacPaint all worked on the ST using the Magic Sac. Since the ST has a bigger monochrome screen than the Mac, you can actually see more on the ST than on the original machine. To use that extra screen space you will have to use more modern Macintosh applications which have been written to accommodate the larger MegaScreen options for the Mac Plus and SE and the big screens offered for the new Mac II.

COLOUR

There is even a utility which allows you to run the Mac emulator on an ST colour monitor, although we did find this to be a slightly tricky business with the choice of using a very fuzzy colour display which showed the whole Mac desktop or by using a relatively clear screen which showed only half the desktop at any one time.

As to some of the other emulators, they all provide interesting extra functions for the ST in their own way. Atari's own CP/M emulator is very useful if you want to get hold of the many public domain CP/M applications that are around, or run some old CP/M software.

The BBC Micro and Apple II emulators announced recently also promise to open up the huge base of applications written in BBC Basic and Applesoft Basic. These two emulators should be of great interest for the education market since there is more educational software for the BBC Micro than any other machine in the UK while the US educational software market is still dominated by the Apple II. A machine like the Atari ST, which might be able to run software written for both systems, could be a great attraction.

It should come as no surprise to most ST owners that the interest in emulators will be limited because little of the software you can run in emulation mode is as good, in terms of making use of the easy-to-use Atari WIMPS interface, as applications already available for the ST in native mode. So while the Atari ST may be an 'anything' machine, you may still want that 'anything' to be an ST.

CALIFORNIA GAMES COMPETITION

Sun, sun, sun. Fun, fun, fun. Two girls for every boy. What more could anyone want (unless they happen to be a girl)? Yes kids, outrageous California is the setting for the latest in the . . . *Games* series from Epyx. Many zany West Coast sports are now all the rage in this country and you will find them all included in this package. Try your hand at BMX biking and disc flying, and try your feet at skateboarding, surfing and rollerskating. Like all the other releases in the series, California Games has unsurpassable graphics, sound and playability.

Your Computer is now getting together with U.S. Gold to give you an opportunity to win this exciting new game. 30 copies of California Games must be won in our simple competition. The first ten correct answers drawn out of the hat will receive in addition an oh-so-trendy Ocean Pacific T-shirt (don't forget to tell us how large your chest is on the coupon). The next ten will receive a Bluebird Aerobie flying disc and a copy of California Games; the last ten will receive California Games. There is also a special star prize for a lucky winner. In addition to an Ocean Pacific T-shirt and a copy of California Games, he or she will receive a spanking new Pacer skateboard.

Three questions in the competition are about sports covered in the game. You then have to answer a Californian question, cut out the coupon and send it to: *Your Computer*, Greencoat House, Francis Street, London SW1P 1DG. Entries by November 19th please.

★ ★ ★ ★ ★ ★

Competition Rules

The winners of the competition will be the persons who send the first all-correct entries drawn from all those received before the closing date of the competition.

The names of the winners will be announced in the December issue of *Your Computer*.

All entries must arrive at the *Your Computer* offices by Thursday 19 November 1987.

Each person must enter the competition only once.

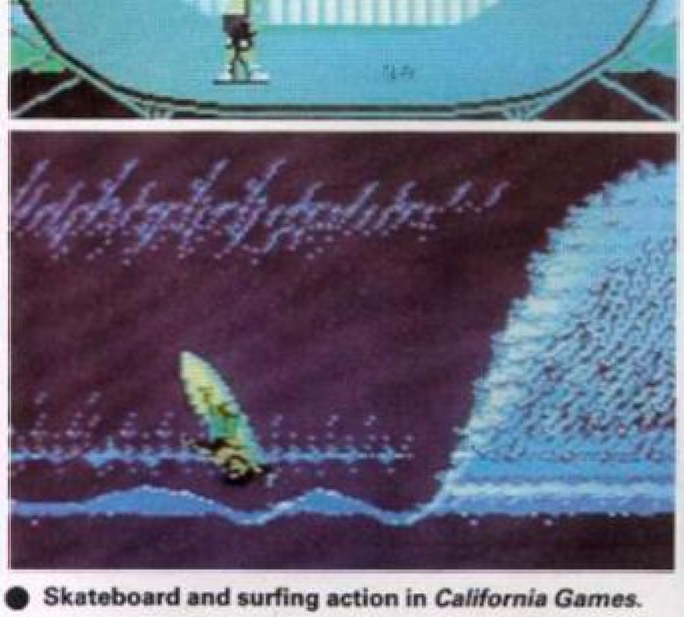
Entries to the competition cannot be acknowledged.

No employees of Focus Investments nor their agents or close relatives may enter the competition.

The decision of the Editor in all respects of the competition will be final.

No correspondence with regard to any aspect of the competition will be entered into.

Focus Investments assumes no responsibility or liability for any complaints arising from this competition.



● **Skateboard and surfing action in *California Games*.**

● A magnificent maniac graces the underside of this month's first prize.



ENTRY FORM

1. In which film does Michael J. Fox skateboard his way out of trouble?
2. Where were the 1987 World Surfing Championships held?
3. What do the letters BMX stand for?
4. Which ex-governor of California held the mistaken impression that Lenin's first name was Nikolai?

Name: ____________________

Address: ____________________

____

____

Postcode: ____________________

Tel. No: ____________________

Signature: ____________________

My computer is: (please tick)

- ☐ Spectrum
- ☐ Amstrad
- ☐ Commodore 64 cass.
- ☐ Commodore 64 disk
- ☐ MSX

My chest is:

S M L XL

(Delete as applicable)

THOUGHTS & CROSSES

(COMPUTERS) LTD.

33 MARKET STREET, HECKMONDWIKE, WEST YORKS

COMPUTERS

Amstrad PCW 8512	£373
Amstrad PCW 8526	£458
Amstrad CPC464 (Colour Monitor) + £100 FREE software	£299
Amstrad CPC6128 (Col. & disk drive) + FREE software	£399
Amstrad PC1512 (Single Drive, mono Monitor)	£516
Amstrad PC1512 (Twin Drive, Mono Monitor)	£642
Amstrad PC1512 (Single Drive, Colour Monitor)	£716
Amstrad PC1512 (Twin Drive, Colour Monitor)	£838
Amstrad PC1512 Hard Disk 20Mb Mono	£1033
Amstrad PC1512 Hard Disk 20Mb Colour	£1129
Atari 520STFM	£299
Atari 1040STF with 1Mb Drive & Mono Monitor	£598
BBC Master Series	£425
BBC Master Compact with green screen monitor	£458
BBC Master Compact with medium res colour monitor	£521
BBC Master Compact + TV Modulator	£417
Sinclair Spectrum Plus 2	£149
Commodore Amiga A500	£545
Amstrad PC1512 twin drive mono with Amstrad DMP3000 Printer Wordstar 1512 A + Supercalc 3	£804
Amstrad PC1640 Single Drive Colour	£918
Amstrad PC 1640 Double Drive Colour	£1033
Amstrad PC 1640 Hard Disk Colour	£1378
Atari 1040 ST	£498
BBC Archimedes	PHONE
Sinclair Spectrum Plus 3	£249

PRINTERS

Canon PW1080A	£285
Canon A55 (141 2 Carriage)	£425
Citizen 120D NLQ	£196
Citizen MSP10E	£275
Citizen MSP 25E (141 2 Carriage)	£525
Epson LX86	£275
Epson LQ 800	£364
Citizen MSP15E (wide carriage)	£325
Panasonic KXP1081	£185
Amstrad DMP 3160	£185
Amstrad DMP 2000	£159

DAISY PRINTERS

Juki 6100	£320
Juki 6200	£549

PRINTER ACCESSORIES

Epson LX80 86 Tractor Unit	£25
Epson LX80 86 Sheet Feeder	£55
Juki 6100 6200 Tractor Feeder	£159
Juki 6100 6200 Sheet Feeder	£229
Citizen 120D Sheet Feeder	£105

EXTERNAL CENTRONICS TYPE

Commodore 64 – Citizen 1200	£50
Kempston interface-E Rom based for Spectrum	£39.95
QL Centronics interface	£25
Tripler 20 64 for CB VIC20 64	£50

PRINTER RIBBONS

Amstrad PCW8256	£5.50
Brother EP44	£2.30
Brother HR5	£2.80
Brother M1009 Centronics GLP	£3.80
Canon Kaga Taxan	£5
CBM MPS801	£5
Citizen 120D	£5
DMP 2000 3000	£5
Epson LX80	£4.50
Epson MX FM RX80	£4
Juki 6100 Single strike	£2
Juki 6100 Multistrike	£5
Mannesman Tally MT80 MT80 Plus	£8
OKI Microline 80	£2.30
Qume Multistrike	£4.30
Seikosha GP100	£4.50
Shinwa CP80CPA80 SP80	£6
Star NL 10	£6

10 or more ribbons deducted 10%. Others available, please ask. Also PRINT WHEELS available, please ask.

LEADS

Amstrad Centronics Printer Lead	£10
Apricot Centronics Lead	£10
Atari 520ST printer	£10
BBC Centronics Printer lead	£10
BBC Microvitec RGB	£5.95
BBC Serial RS232 Printer Lead	£10
Commodore Serial Lead	£5.95
Einstein Centronics Printer Lead	£10
IBM Printer Lead (Cable)	£10
Memotech Centronics Printer Lead	£10
MSX Centronics Printer	£15
Opus Discovery Centronics Lead	£15
QL to RS232 Lead	£14.95
Wafadrive to Centronics Lead	£15
ZX interface 1 to RS232 'D'	£14.95
RS232 'D' to RS232 'D'	£15

MONITORS

Amiga 1081 Colour Monitor	£390
Atari Sm125	£120
Microvitec 1451 MS (Standard res)	£215
Microvitec 1451 MS (Medium res)	£269
Microvitec 1451 DQ Sinclair QL	£275
Philips 7502 anti-glare screen monitor (20MHz)	£82
Philips 7522 anti-glare amber screen monitor	£95
Philips 7542 anti-glare paper white monitor (20MHz)	£95
Philips 8833 RGB/TTL/Audio Med Res	£290

DISK DRIVES

Amstrad PCW 512k Upgrade + 720k Second Drive	£189
Atari SF354 SMb Drive	£100
Atari SF314 1Mb Drive	£190
Cumana (Atari) 1Mb Drive	£139
QL 720K Drive + interface	£199
QL Twin 720K Drive + interface	£299
Amstrad FD-1 (Second Drive)	£99
Cumana CSX 400	£135
Commodore 1541C	£195
Cumana CD800S	£219
Commodore Amiga Disk Drive (Cumana) 1mb	£139

DISKETTES

5¼" SS DD 48 + pi	10 for £9
5¼" DS DD 48 + pi	10 for £9
5¼" DS DD 96 + pi	10 for £9
3" CF2	10 for £29
3½" Single Sided	10 for £16
3½" Double Sided	10 for £22

AMSTRAD PC PRODUCTS

10 MByte Hardcard + Controller Card (Dysan)	£349.00
30 MByte Hardcard + Controller Card (Storage Master)	£599.00
FD-3 Second Disk Drive	£199.95
Hard Disk Backup Unit (including Cartridge)	£530.00

PSION ORGANISER PRODUCTS

Organiser 11 CM (8KRam/32KRom)	£98
Organiser 11 XP (16KRam/32Krom)	£139
Datapak 16K Ram Upgrade	£19
Datapak 32K Ram Upgrade	£34
Datapak 64K Ram Upgrade	£59
Comms Link (RS232) – PC	£59
Link Up Adaptors	£12
Mains Adaptor	£12.95
Formatter	£42

ATARI ST SOFTWARE

Crystal	Antic	£22.50
GFL Football	Activision	£22.50
Little Computer People	Activision	£22.50
Music Studio	Activision	£28.95
CAD 3D	Antic	£45.00
Print Master	Ariolasoft	£28.95
Fast Comm	Atari	£45.00
Back Pack	Computer Concepts	£45.00
Fast Basic	Computer Concepts	£81.00
GFA Basic	Glentop	£54.00
GFA Basic Compiler	Glentop	£54.00
1st Word Plus	GST	£72.00
Haba Writer 2	Haba	£57.00
Devpac	Hisoft	£44.95
Saved	Hisoft	£23.50
Degas Elite	Batteries Inc	£49.00
Fast Basic (Disk)	Computer Concepts	£40.00
Beaurocracy	Infocom	£31.50
Enchanter	Infocom	£28.95
Hitch Hikers Guide to Galaxy	Infocom	£28.95
Hollywood Hijinx	Infocom	£28.95
Leather Goddesses of Phobos	Infocom	£28.95
Sorcerer	Infocom	£28.95
Spellbreaker	Infocom	£28.95
Trinity	Infocom	£31.50
Wishbringer	Infocom	£28.95
Prohibition	Infogrames	£18.00
K Graph 2	Kuma	£45.00
K Resource	Kuma	£36.00
K Spread 2	Kuma	£72.00
Megamax C	Megamax	£140.00
Assembler	Metacomco	£45.00
BCPL	Metacomco	£90.00
Cambridge Lisp	Metacomco	£135.00
Lattice C	Metacomco	£90.00
Make	Metacomco	£45.00
MCC Pascal	Metacomco	£81.00
Menu +	Metacomco	£18.00
Goldrunner	Microdeal	£22.50
Balance of Power	Mindscape	£26.95
Art Director	Mirrorsoft	£45.00
Fleet Street Editor	Mirrorsoft	£100.00
Mercenary Compendium	Novagen	£22.50
Chess	Psion	£22.50
Jewels of Darkness	Rainbird	£18.00
Silicon Dreams	Rainbird	£18.00
Starglider	Rainbird	£22.50
The Pawn	Rainbird	£22.50
Accountant	Sage	£152.00
Accountant Plus	Sage	£206.00
Book Keeper	Sage	£102.50
Roadwar 2000	Strategic	£22.50
Flight Sim 2	Sublogic	£45.00
Trimbase	Talent	£81.00
Printmaster Gallery 1	Unison	£26.95
Leaderboard	US Gold	£22.50
Leaderboard Tournament	US Gold	£8.95
Metrocross	US Gold	£22.50
Silent Service	US Gold	£22.50
Ultima 3	US Gold	£22.50
Winter Games	US Gold	£22.50
VIP Professional Gem	VIP Tech	£199.50
Barbarian	Psygnosis	£22.50
Road Runner	U.S. Gold	£22.50
Arctic Fox	Electronic Arts	£26.95
Pirates of Barbary Coast	Cascade	£11.95
Jupiter Probe	Microdeal	£22.50

AMSTRAD PC 1512/IBM COMPATIBLE SOFTWARE

ACCOUNTING SOFTWARE		
Financial Manager	Camsoft	£122.00
Payroll	Camsoft	£41.00
Bookworker	Compsoft	£152.00
Money Manager Plus	Connect	£30.00
Easy Accounting	DAC	£90.00
Easy Mate	DAC	£47.00
Easy Tutor	DAC	£29.00
Integrated Accounts	MAP	£122.00
Sales Ledger & Invoicing	MAP	£41.00
Sales & Marketing	MAP	£31.00
Magic	MAP	£31.00
Nominal Ledger	MAP	£41.00
Purchase Ledger	MAP	£41.00
Stock Control	MAP	£41.00
Payroll	MAP	£41.00
Mapspec (SSP System)	MAP	£41.00
Sales Order Entry	MAP	£57.00
Purchase Order Entry	MAP	£57.00
Job Costing	MAP	£91.00
Book Keeper	Sage	£69.00
Accountant	Sage	£136.00
Accountant Plus	Sage	£166.00
Financial Controller	Sage	£276.00
Payroll	Sage	£93.00
Accountability	Migent	£96.00
ADVENTURE GAMES		
Carmen Sandiego	Broderbund	£27.00
Do-Tapes	Polarware	£13.50
The Crimson Crown	Polarware	£13.50
Transylvania	Polarware	£13.50
Kings Quest	Sierra	£18.50
Space Quest	Sierra	£18.00
Wizards Crown	S.S.I.	£22.50

BUSINESS PRODUCTIVITY

ABC (Complete Business)	ABC	£145.00
Homebase	Amber	£57.00
Reflex (PC 1512 only)	Amsoft	£57.00
Sidekick	Amsoft	£27.00
Reflex	Borland	£83.00
Dominoe	Compsoft	£81.00
One Up	Compsoft	£41.00
Able One	Conceptdata	£81.00
Hal	Lotus	£112.00
Ability Plus	Migent	£149.00
Moneypower	Moneywise	£81.00
PC Four	Psion	£95.00
Deskset	Sage	£95.00
Portex System	Showerings	£93.00
Open Access 1 Entry	SPI	£122.00

COMMUNICATIONS

Chitchat	Sage	£95.00

DATABASES

Cambase	Camsoft	£41.00
Delta 4.3	Compsoft	£81.00
Dac-Base	DAC	£41.00
Superbase Personal (Gem)	Precision	£81.00
Retrieve	Sage	£95.00
GBase (Gem)	SPI	£81.00
SSI Data	SSI	£183.00
Tas Plus	Tas	£93.00

ENTERTAINMENT SOFTWARE

ADVENTURE GAMES		
Portal	Activision	£22.50
Dragonworld	Audiogenic	£18.00
Fahrenheit 451	Audiogenic	£18.00
Nine Princes in Amber	Audiogenic	£18.00
Ballyhoo	Infocom	£27.00
Deadline	Infocom	£21.00
Enchanter	Infocom	£21.00
Enchanter Invisiclues	Infocom	£5.95
Hitchhikers Guide to Galaxy	Infocom	£26.00
Leather Goddesses of Phobos	Infocom	£27.00
Moonmist	Infocom	£27.00
Planetfall	Infocom	£21.00
Seastalker	Infocom	£21.00
Trinity	Infocom	£31.00
Wishbringer	Infocom	£26.00
Zork 1	Infocom	£21.00
Zork 2	Infocom	£21.00
Zork 3	Infocom	£21.00
Jewels of Darkness	Rainbird	£18.00
Silicon Dreams	Rainbird	£18.00
Ultima III	US Gold	£18.00
Bureaucracy	Infocom	£31.00
Stationfall	Infocom	£27.00
Passengers in Wind	Infogrammes	£22.50
Lord of Rings	Melbourne	£18.00
ARCADE GAMES		
GBA Championship Basketball	Activision	£22.50
Alex Higgins Snooker	Amsoft	£18.00
Mean 18 Golf	Amsoft	£18.00
Pinball Construction	Amsoft	£18.00
Pitstop II	Amsoft	£18.00
Summer Games II	Amsoft	£18.00
Winter Games	Amsoft	£18.00
World Games	Epyx	£22.50
Super Sunday	Nexus	£21.00
Great Escape	Ocean	£18.00
Top Gun	Ocean	£18.00
AM FM Trivia 1	PC Leisure	£9.00
AM FM Trivia 2	PC Leisure	£9.00
Boulderdash	PC Leisure	£9.00
Boulderdash 2	PC Leisure	£9.00
Starglider	Rainbird	£18.00
Bruce Lee	US Gold	£18.00
Infiltrator	US Gold	£22.50
Rock 'n' Wrestle	Melbourne	£18.00
Strip Poker	US Gold	£18.00
World Series Baseball	Imagine	£18.00
STRATEGY SIMULATION		
GFL Championship Football	Activision	£22.50
Cyrus II Chess	Amsoft	£18.00
Destroyer	Epyx	£22.50
Conflict in Vietnam	Microprose	£22.50
Crusade in Europe	Microprose	£22.50
Decision in the Desert	Microprose	£22.50
F15 Strike Eagle	Microprose	£26.00
Hellcat Ace	Microprose	£16.00
Silent Service	Microprose	£22.50
Solo Flight	Microprose	£18.00
Spitfire Ace	Microprose	£16.00
Flight Simulator	Microsoft	£45.00
Flight Simulator Scenery (Single)	Microsoft	£18.00
Flight Simulator Jet Scenery Disks 1-6	Microsoft	£85.00
Balance of Power	Mindscape	£27.00
Chess	Psion	£22.50
Checkmate	Robtek	£13.50
Jet	Sublogic	£43.00
Bridge Player 2000	CP Software	£17.95
Gettysburg	S.S.I.	£27.00
Battle of Antietam	S.S.I.	£27.00
Gettisburg	S.S.I.	£27.00
OTHERS		
Music Studio	Activision	£22.50
Music Construction	Amsoft	£18.00
Mind Prober	Human Edge	£31.00
Fortune Teller	Status	£13.50

GEM SOFTWARE

Gem Diary	Digital Research	£31.00
Gem Draw	Digital Research	£81.00
Gem Draw Business Library	Digital Research	£31.00
Gem Font Editor	Digital Research	£81.00
Gem Fonts & Drivers	Digital Research	£31.00
Gem Graph	Digital Research	£81.00
Gem Programmers Toolkit	Digital Research	£145.00
Gem Word Chart	Digital Research	£81.00
Gem Write	Digital Research	£81.00

SPREADSHEETS

Supercalc 3	Amsoft	£83.00
Logistix	Grafox	£93.00
K Spread 2	Kuma	£55.00
Words & Figures	Lifetree	£93.00
VP Planner	Paperback	£81.00
PC Planner	Sage	£93.00
Math Plan	SSI	£350.00
Lotus 123	Lotus	£310.00
Multiplan Junior	Microsoft	£36.00

UTILITY SOFTWARE

Superkey	Borland	£57.00
Turbo Basic	Borland	£86.00
Turbo Gameworks	Borland	£41.00
Turbo Lightning	Borland	£86.00
Turbo Pascal	Borland	£86.00
Turbo Pascal Graphic Toolbox	Borland	£46.00
Turbo Prolog	Borland	£86.00
Dac Easy Port	Dac	£29.00
FT Modula 2	Hisoft	£45.00
The Knife-86	Hisoft	£25.00
Learning DOS	Microsoft	£25.00
Quick Basic	Microsoft	£70.00
Bookmark	Intellisoft	£94.00
Fastback	5th Generation	£182.00
Turbo C	Borland	£86.00
Turbo Pascal Database	Borland	£46.00
Sideways	Funk Software	£45.00

WORD PROCESSORS

Mindreader Executive	Advance	£41.00
Wordstar 1512	Amsoft	£69.00
First Word Plus	GST	£58.00
Volkswriter 3	Lifetree	£165.00
Word Junior	Microsoft	£36.00
PC Write	Sage	£90.00
Wordperfect Junior	SSI	£80.00
Wordperfect Personal	SSI	£160.00
Wordperfect Library	SSI	£138.00
Taxword PC	Tasman	£22.50
Taspoint PC	Tasman	£27.00
Wordperfect	Wordperfect Corp	£366.00

MISCELLANEOUS

Basic 2 Manual	Amsoft	£11.50
Autosketch drawing tool	Autodesk Inc	£73.00
Motor Trade Package	Blyth Craftware	£96.00
Professionals Package	Blyth Craftware	£96.00
Rental Package	Blyth Craftware	£96.00
Touch 'n' Go Typing Tutor	Carlton	£22.50
Delta Graph graphics analysis	Compsoft	£57.00
Crash Course in Typing	Iansyst	£27.00
Two Fingers to Touch Typing	Iansyst	£27.00
Fleet St Editor electronic publishing	Mirrorsoft	£122.00
Fontasy Ver 2	Prosoft	£56.00
Complete introduction audio & floppy	Realtime	£27.00
PC Till	Retail Solutions	£95.00
Summamouse	Summa	£110.00
Newsroom	Ariolasoft	£37.00

MODEMS

Nightingale Modem	£96.00
Linnet Modem	£138.00
W.S4000 Modem	£170.00

WE ALSO STOCK SOFTWARE FOR

Spectrum	500 titles
Commodore 64	400 titles
Amstrad 464	200 titles
Amstrad 6128	200 titles
Amstrad PCW8256 8512	100 titles
BBC	200 titles
QL	60 titles
Commodore Amiga	titles

Tel: (0924) 409753 for VISA

Government, Local Authority, Educational enquiries sought.
Special B.F.P.O. Rates.

ALL PRICES INCLUDE VAT AND CARRIAGE

EXPORT ORDERS WELCOME
ASK OR SEND FOR PRICE LIST

Tel: (0924) 402337 for General Enquiries.
Telex: 556577 CROSS G

Shop open 9-5pm Mon-Sat; Mail Order 9-8pm Mon-Sat.
You can phone up to 8pm and speak to a real voice.

ADVENTURE PLAYGROUND

MIKE GERRARD TAKES TIME OFF THIS MONTH TO ANSWER SOME QUERIES FROM READERS

Look, I'm feeling a bit lazy this month, what with being an Orc last month and trying to deal with Lurking Horrors all this week, so do you think you lot out there could possibly step in and write the Adventure Playground for me? You could? Oh good.

No doubt Steven Penfold of Pinner in Middlesex would even try to write the whole thing in verse, like the epic he penned me in the hope of extracting a hint for *The Hitchhiker's Guide to the Galaxy*. Fortunately his poetry wasn't quite as bad as the Vogons, although it ran pretty close on occasion: *The subject of my woeful plea?/ Hitchhiker's is its name/Must be a way that I can't see/To end this silly game/ No problem with item "no tea"/Nor hence the talking door/But Marvin's quite useless you see/For opening the floor.*

I refuse to resort to verse to give Steven the answer he's looking for. Well, I've been a bit miffed ever since they gave the Poet Laureate's job to Ted Hughes. All I could suggest to Steven in plain prose is that he make Marvin stick to the task, and he'll need something from a dream.

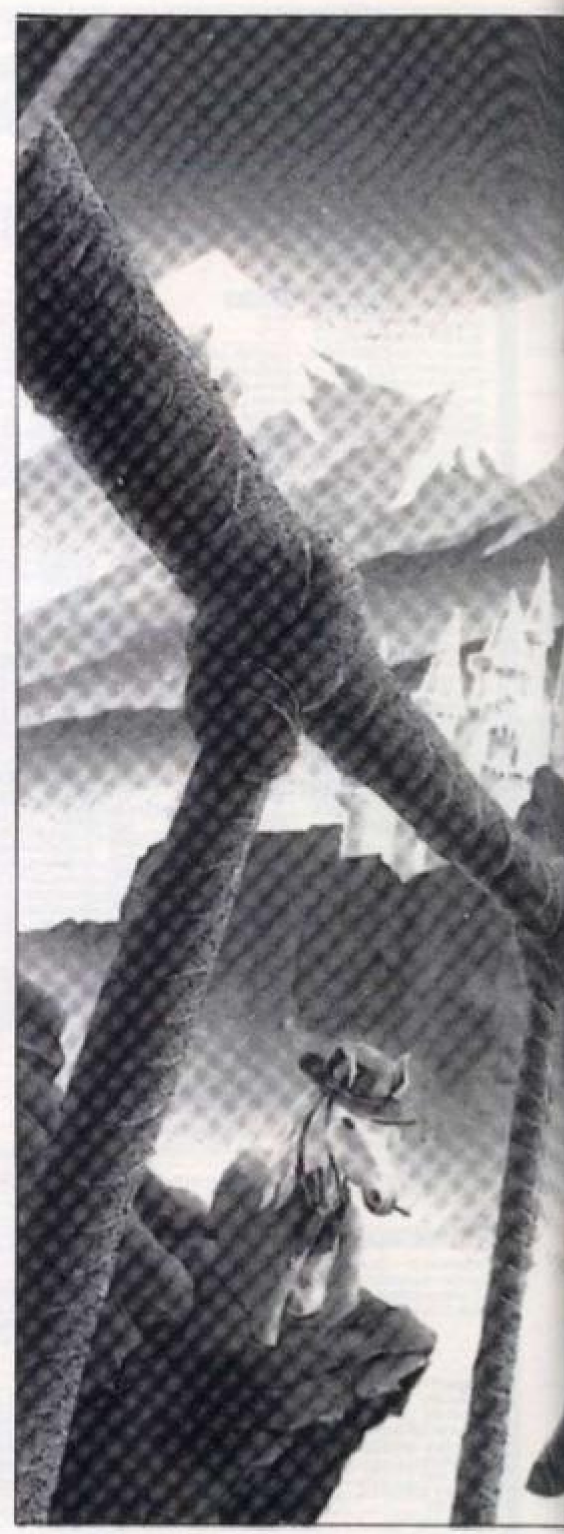
Allan Palmer of Basingstoke wants to work for British Rail, I think, as he apologises for the late arrival of his letter. It seems he wrote to me back in 1984 about an adventure book I'd written, and I replied, and he's been meaning to get round to writing back ever since. Still, it's best not to rush these things, I feel. But if you're going to write letters full of praise for the new-look *Your Computer* and especially the Adventure Playground section then don't leave it three years next time. "The July column of yours was a very intelligent and well-written discussion on the philosophy of Adventure-help."

Naturally if I'd been writing this month's column myself I'd have been too modest to repeat Allan's quote, but as you're writing all this for me it doesn't matter too much. I can take it. (More, more!)

Allan's feelings on help are that hints and clues are infinitely preferable to outright solutions, and generally I'd agree with him, but having racked my brain on many an occasion to come up with an appropriate hint I can tell him that it's not always easy. One reader recently asked me for a hint about the answer to the Sultan's riddle in *The Leather Goddesses of Phobos*. Now anyone who knows the answer will know how hard it is to give a hint without either being much too vague or giving the whole game away. You could say something like "The answer's in the question", but will that put them on the right track?

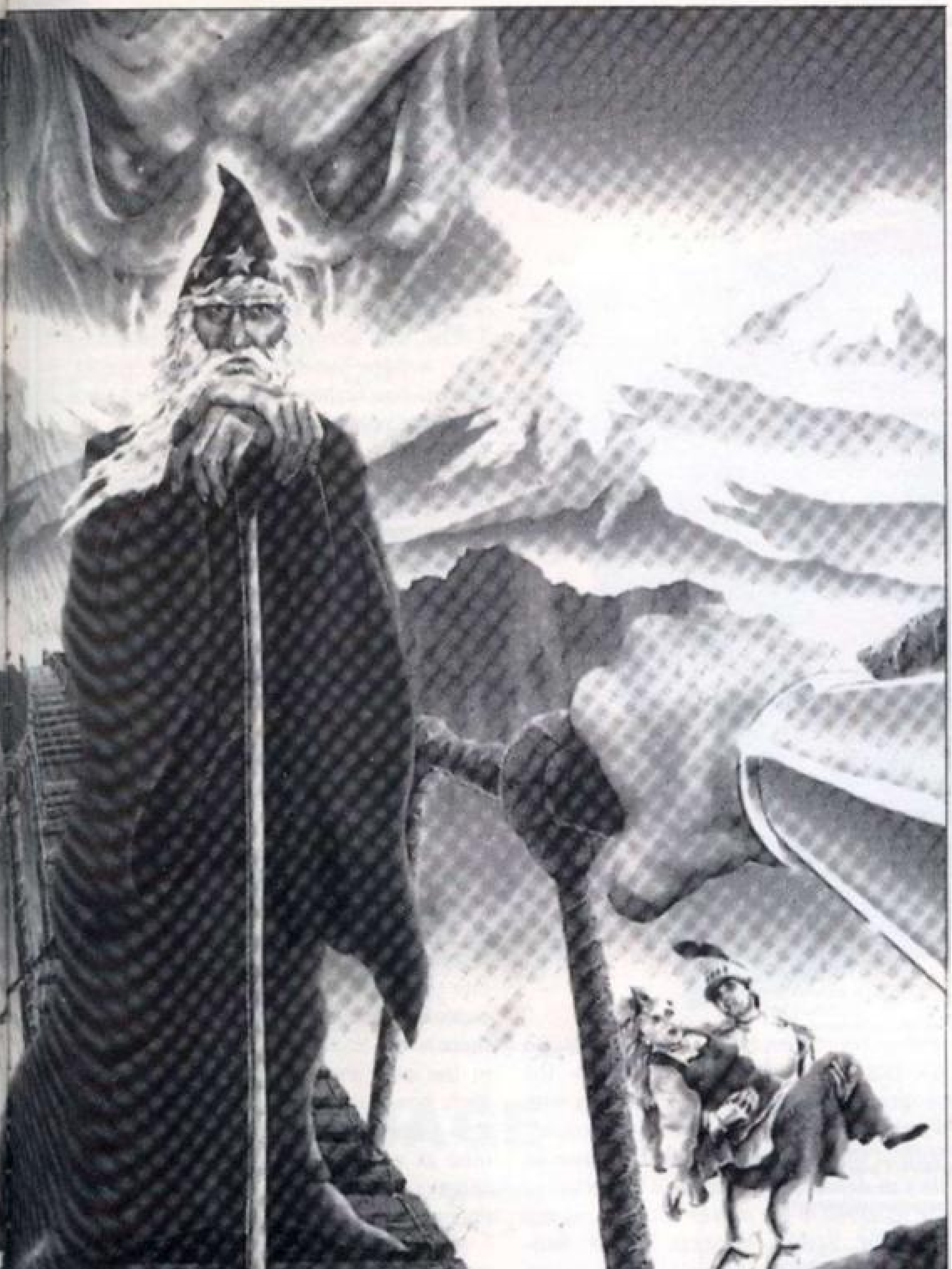
Problems

Beginners often ask how you come up with the answers to some of the tough problems in adventures. Every one's different, I think, and with regard to the Sultan's riddle you might be interested to know how I worked that one out. When the game was first released my buddy and fellow software-reviewer Johyn D. Ryan came over to play the adventure with me one evening. We got as far as the Sultan's riddle and were absolutely stuck. We were making lists of possible answers and crossing them off as we tried them. We went elsewhere in the game and kept coming back to the riddle. No joy. We had to admit defeat . . . temporarily, of course. Next morning, first thing, John phoned me: "I've got it . . . the answer to the riddle! I woke up this morning and I just realised what it was, so I rushed into the computer room, loaded the game up and it worked! It's so obvious!"



Now being told that something you've spent the best part of an hour trying to work out is obvious is not usually designed to put you in a very good frame of mind, but at the moment when John said it was obvious I instantly knew what the answer was myself, as if by ESP. So that's one way of working things out – inspiration!

Back to Allan Palmer's letter, and the question of piracy and software protection. I agree with him that the best method of software protection is the "hardware key" approach such as Infocom have taken in their latest games. In *Ballyhoo*, for example, you'll need to examine a ticket in the packaging in order to get through one particular gate, as the ticket contains some information that's not contained elsewhere. *Stationfall* contains a lengthy list of planet co-ordinates, and *Hollywood Hijinx* contains a verse that gives direction clues. In *Bureaucracy* at one point you're given a lengthy quiz over the contents of *Popular Paranoia* magazine, also contained in the packaging.



● **Some wizard wheezes in this article will help you with "The Pawn".**

Naturally things like this can frequently be photocopied, and unscrupulous people will do whatever they need to do to get round protection, but the Rainbird 'Novella' approach is also one that makes life quite rightly as difficult as possible for the pirates.

Finally Allan suggests a possible subject for a future Adventure Playground (all ideas gratefully received), which is the Adventure sections on Bulletin Boards. This sounds like a good idea to me, especially as I'm dithering over whether to get a modem or not at the moment. My resistence is cracking, so if anyone with comms experience wants to recommend any particular Bulletin Boards or anything else in that area, then do let me know.

Colossal

And now who would like to help a damsel in distress down under? I'll re-phrase that, who can help an Australian adventurer with a *Colossal* problem? The adventurer is Fay Shaw, 1/1 Wyuna Road, Point Piper, Sydney, NSW 2027, Australia. Fay's playing the original mainframe version and has my help sheet that deals with the Level 9 version. One is when the caves have closed and you're escorted to the Repository, where Fay's told that one of the words she knows can be used again in a different way. She thinks it may be FEE, but doesn't know how to use it. Any gallant adventurers to the rescue? In return, Fay offers some magic words which are not implemented in the various micro versions of the game, words like: BARREN, FORK PATH, VIEW, SLAB and ORIENT.

Another far-flung adventurer is Sumanth Ramamurthi of Race Course Road, Coimbatore, India: "I am having a little difficulty in solving the adventure game, *The Hobbit*. The problem is in the cellar of the Elvenking's Great Hall. The obvious thing to do is to take the barrel and go down through the trapdoor. But if I attempt to do that, I am swept forcefully against the portcullis and I die. So how do I go down without getting killed?

Going down without getting killed is come across a few features not covered by indeed a problem. I may even have to resort to the infamous backwards-writing to explain how it's done. The cellar seems a very popular place with the butler, he certainly seems to visit it much more frequently than the line of duty might suggest. He is the key to your escape. He musn't see you, so GNIR RAEW at all times.

You also need to get into LERRAB YTPME NA, but there's no such thing, though sometimes the butler will guzzle the contents and thoughtfully provide you with one. If he doesn't, there's nothing for it but to tackle the problem yourself: ENIW KNIRD DNA LERRAB NEPO. This may affect your speech somewhat, but don't worry as there are no nasty hangovers waiting at the end of it. Having done all this, all that remains for you to do is to LERRAB OTNI BMILC then LERRAB ESOLC and finally TIAW.

PMUs

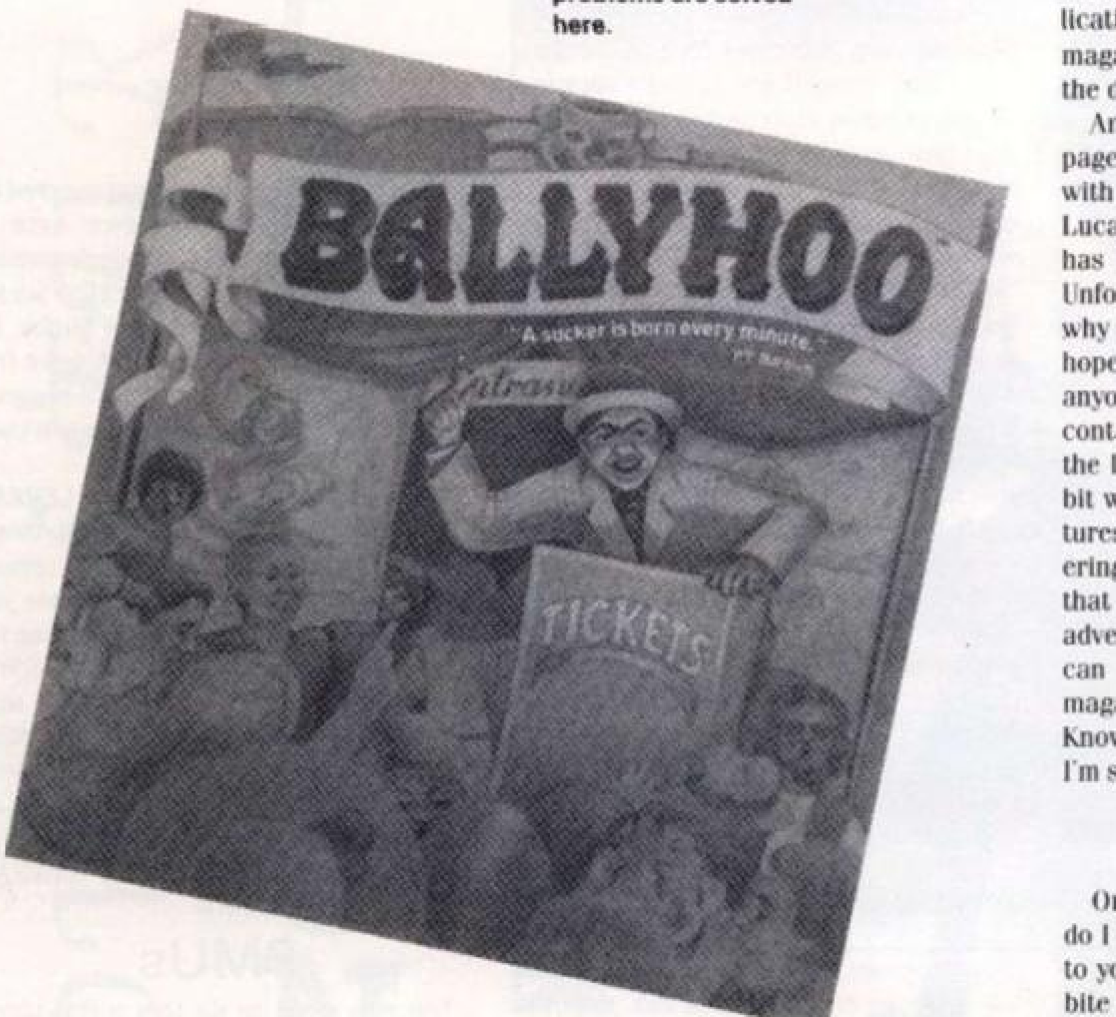
You may need to do this a few times before the desired result is achieved. A simpler option can be just to PMUJ when you see the butler throwing a barrel through the trapdoor, though you have to be quick to avoid a nasty end.

Marie Carr of Chorley is also impressed by the new *Your Computer* and says "It was a pleasure to read a magazine written in English, as being owners of a Spectrum we used to get [name deleted!] until it deteriorated completely. Why do all the magazines not cater for the whole family, as they used to do? We use the computer for our five- and six-year-old children, as well as playing the odd game ourselves. Our six-year-old went to school already reading and with good number concepts thanks to starting on the computer at the age of three. Sorry to get on my hobby horse . . . but would you kindly send me a copy of your Adventure Help List!"

Happy to oblige, Marie, and I hope that a healthy selection of adventures are being loaded into your Spectrum to help your children as well as amuse yourselves. A regular bout of keyboard typing and brain-stretching just has to be good for any child's vocabulary, spelling, logical processes etc.

To show that *Your Computer* does really get around the globe, here now is a letter from a Norwegian reader hiding behind the name of The Northern Adventurer. And he doesn't mean Bradford, either. Struggling away in *The Pawn* and *Adventure Quest*, he offers other readers some tips for those

● **No need for any Ballyhoo; all your problems are solved here.**



games. In the first, to get past the paper will room you first DRAOBPUC NEPO, then KOOH OT EPOR EIT, then KOOH HTIW LLAW REPAP RAET and finally NWOD BMILC NEHT EPOR TEG. To read the Tomes you must SEMOT NO LLEPS A TSAC. To kill Kronos you first SONORK TA ELTTOB NOITOP WORHT, then you LVOSOREA NO ELZZON SSERP and LIVED OT LUOSOREA EVIG. For this last action, says The Northern Adventurer, you get "lotsa points!"

Desert

In *Adventure Quest*, to deal with the shark: TNEDIRT EHT YRRAC. How to cross the desert? When you reach the 'trackless desert' write this: EEENWNN (and that's still backwards).

In return for all this our intrepid Norwegian adventurer asks, like many other readers, how to deal with the dragon in *The Pawn*, how to find the two keys to the wooden door in the Ice Tower and the safe in the office, and how to enter the platform.

Firstly the keys. Though there is more than one key in the game, you're currently looking for the long slender one which will come in useful in two places. It's in a niche, and if you can't find the niche then LATSEDEP EULB EHT HSUP. At least, the key *should* be in the niche. If it isn't then it means the Adventurer (not you, the other one) is still on the loose somewhere.

To get past the dragon is one of the hardest parts of *The Pawn*, and not because it's genuinely difficult but because the programmers have decided it's 'play with words' time. You have to do two actions, both of which are essentially the same as they're drawing the dragon's attention to the shadows in the corner of the room, but Magnetic Scrolls in their infinite foolishness (on this occasion at least) decided to make the player do this twice, in two different ways, and in the right order, and all within a few moves before the dragon sees you off. It's an idea never to be repeated, I hope. In this case you first SWODAHS EHT TA ETIHW EHT ENIHS and then you SWODAHS EHT TA TNIOP.

Finally, oh Northern Adventurer and anyone else who's interested, to use the platform, you must SEHTOLC S'SONORK RAEW and be careful not to carry too many objects. When on the platform: NWOD OG. Or in other words: LLEH OT OG. No offence.

Grandfather

To show that adventurers range over all age groups as well as all countries, here's a letter from 67-year-old L. S. Hall of 145 Brenda Road, Hartlepool, Cleveland TS25 1QG. Mr. Hall shows a great deal of sense, as he didn't do what many people with grandchildren do, and buy a computer for them in the hope that he could use it when they weren't around. On his retirement he bought himself a machine and a separate one for the grandchildren. A wise move! The machine he chose was an MSX, and through this he's been enjoying the new world of adventure games. Unfortunately the magazine *MSX Computing* ceased publication recently. It became an ex-magazine. It is no more, and all the rest of the dead parrot sketch.

Anyway, Mr. Hall hopes through the pages of *Your Computer* to make contact with someone by the name of Mr. S. W. Lucas, who according to *MSX Computing* has written several adventure games. Unfortunately there's no address, which is why I've printed Mr. Hall's in full in the hope that S. W. Lucas might be reading, or anyone who has his address, and they can contact Mr. Hall and bring some joy into the life of an MSX user who's obviously a bit worried at the limited range of adventures for that machine. Mind you, considering the entire Level 9 range is available, that should be enough to keep anyone adventuring till the cows come home. And can anyone who knows of any MSX magazines please also contact Mr. Hall? Knowing what kind souls adventurers are, I'm sure you'll come up with something.

Fanzines

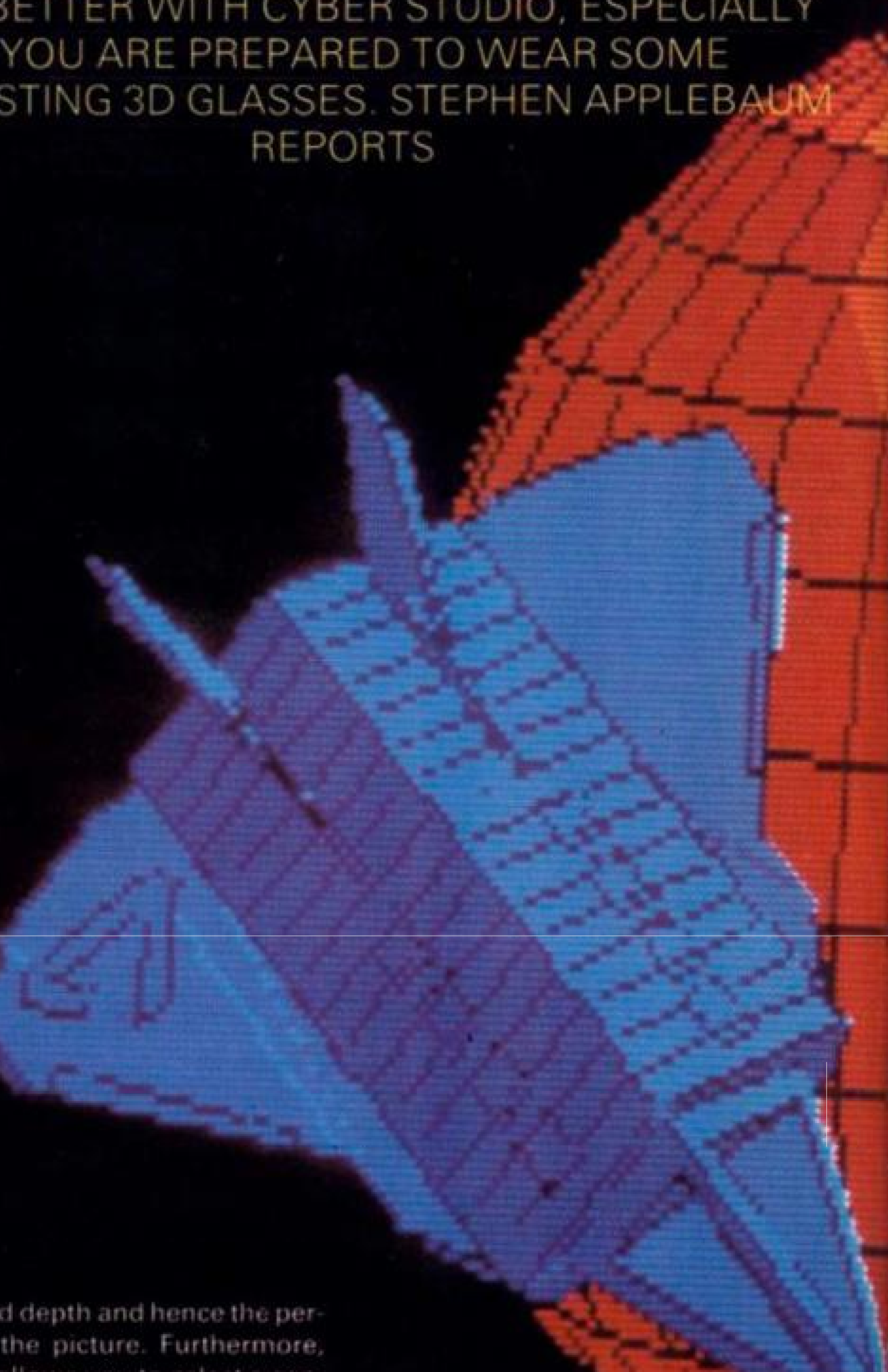
On the subject of Magazines, no sooner do I recommend a few adventure fanzines to you in the June issue than two of them bite the dust! This is rather embarrasing, especially as I said that I "can recommend them in the knowledge that they do arrive in the post month after month". Ahem. Well, how was I to know that Ron Dawson, who edits *Insight*, was going to get promoted at work and so no longer have the spare time to devote to his little endeavour?

In fact it's only one that's bitten the dust, as the second, *Adventure Contact*, has been rescued by a new editor prepared to take over the duties that finally proved too much for Pat Winstanley of Wigan. Personally I think she just wants to spend more time down the pub, but she insists that with a family to look after as well, she could no longer afford to put the time and the money into keeping *Contact* going. Anyone who's seen the magazine will be disappointed at that news, as it's unique in dealing primarily with adventure writing and publication.

At this point enter Colin Page, new editor. Despite the fact that he runs a restaurant, he seems to think he'll also have the time to edit *Adventure Contact*. Good luck to him. Hope the menu doesn't suffer! By the time you read this, existing subscribers should have received the first issue under Colin's editorship, and those wishing to sample a copy should send £1 to Colin Page, The Kingfisher Restaurant, 91 Palmerston Road, Boscombe, Bournemouth BH1 4HP. Personally, I'm still awaiting my invitation to a slap-up fish supper. Until next month.

X-RAY SPEX

ANTIC HAS MADE ITS ORIGINAL 3D CAD PACKAGE EVEN BETTER WITH CYBER STUDIO, ESPECIALLY IF YOU ARE PREPARED TO WEAR SOME INTERESTING 3D GLASSES. STEPHEN APPLEBAUM REPORTS



Back in the March '87 issue of *Your Computer*, we featured *CAD-3D*, a powerful three-dimensional solid modelling package for the Atari ST range of micros. Since then, Antic, the program's Stateside manufacturer, has worked on producing an enhanced version to run specifically on STs with one megabyte or more of RAM. The result is *Cyber Studio*, a package featuring stereo CAD-3D 2.0 plus Cybermate, an animation editing language based on Forth.

Cybermate is a major innovation because it provides the means to combine and animate objects and images designed using CAD-3D and Degas Elite, as well as add sounds created with the GIST sound generator. Only very simple animation effects were possible with CAD-3D; with Cybermate and CAD-3D 2.0 you can create short computer movies which compare well to early mainframe flicks.

Cyber Studio also includes a new stereo feature which displays objects as two identical images set very slightly apart. Viewing an image displayed thus while wearing a pair of Stereotek glasses, available as an optional extra, makes it appear as though it were floating in mid-air, truly in three dimensions.

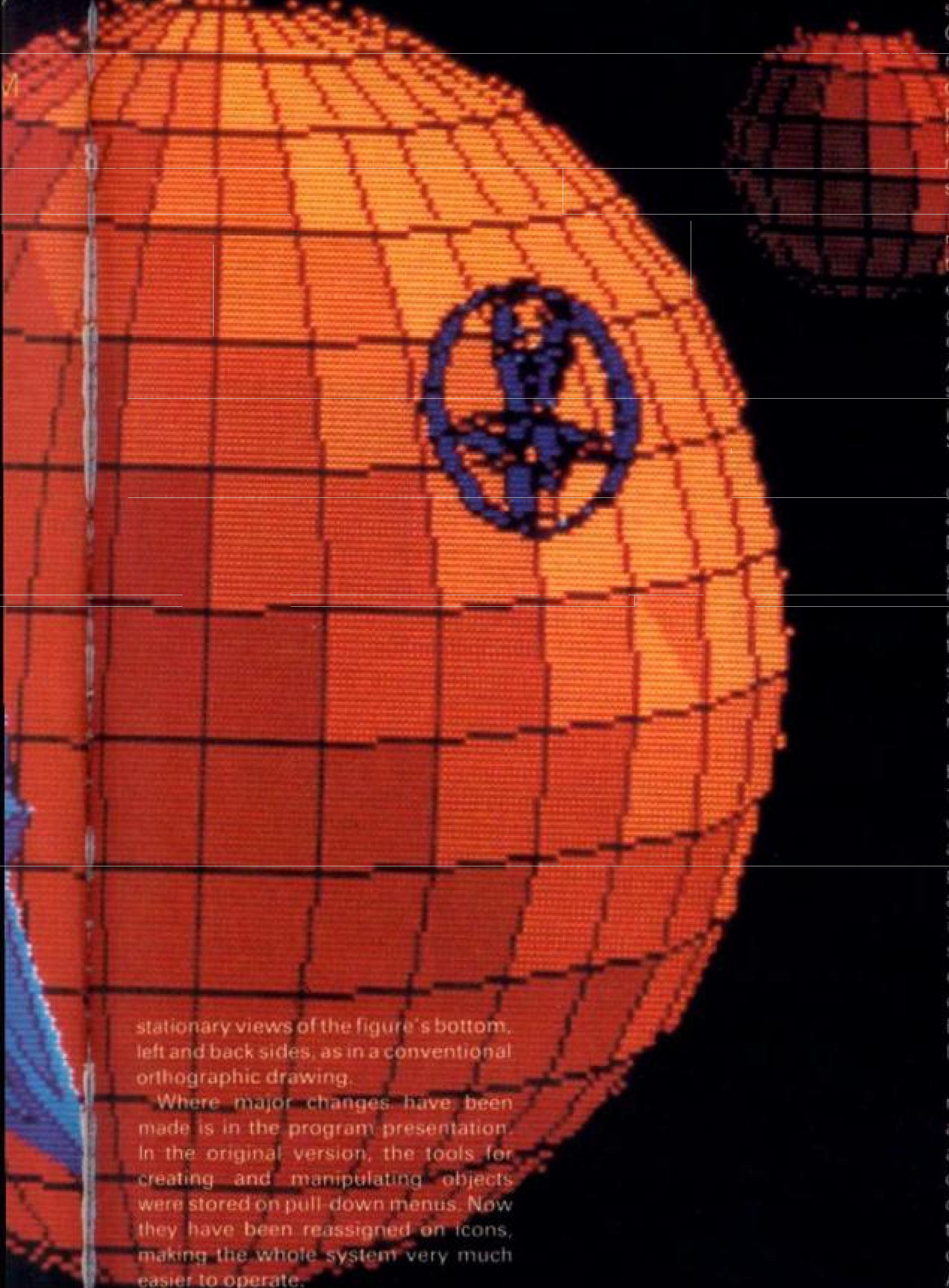
These glasses are not at all like the flimsy cardboard specimens rigged with red and green filters which were given away at cinemas for viewing budget 3D movies. Instead they use liquid crystal shutters synchronised to open and close with the flickering, seemingly vibrating, stereo images on screen. The glasses attach to the ST via a box which plugs into its cartridge port.

When in operation, the lenses open and shut so that only one is open at a time. The movement of the lenses is synchronised to the switching on and off of the left and right images on screen. When the left lens is opened, the left image is displayed and vice versa.

Increasing and decreasing the separation between the two images alters the perceived depth and hence the perspective of the picture. Furthermore, CAD-3D 2.0 allows you to select a convergence point so that the resultant 3D object can be made to appear either to be behind the monitor screen, at the monitor screen or in front of it.

Although the 3D effect produced by the Stereotek glasses is impressive, at £149.95 they are a luxury few people other than professional designers will be able to afford. Were they made cheaper, the scope for sales would undoubtedly widen considerably.

CAD-3D 2.0 operates in much the same way as its precursor. Objects are created within a cubical 3D universe and viewed through four windows. The main window, 'CAMERA', acts like a roving eye which can see any part of an object or objects being worked on, whether it be from a distance or close up. The other three windows display



stationary views of the figure's bottom, left and back sides, as in a conventional orthographic drawing.

Where major changes have been made is in the program presentation. In the original version, the tools for creating and manipulating objects were stored on pull-down menus. Now they have been reassigned on icons, making the whole system very much easier to operate.

As well as icons, new dialogue boxes have been added. For example, illuminating an object using the program's three in-built light sources was previously done by positioning them using a method so unlike placing lights around a subject that it often caused the final effect to be nothing like that which was originally intended.

CAD-3D 2.0, on the other hand, utilises a dialogue box containing three views representing the top, front and right sides of the three dimensional universe. Using the mouse, a small light-bulb can be picked up and dragged to any position on each view, giving you total control over the lighting.

As mentioned earlier, objects created with CAD-3D can be used in short animated sequences made with Cybermate. However, to use Cybermate you need to know CAD-3D inside out and more than just a bit about programming; knowledge of Forth helps because many Cybermate commands have been lifted straight from said language.

Despite its exotic epithet, the Cybermate program is basically an interpreter kitted with a page-or frame-based editor. Compared to the rest of the glitzy package, the latter is something of a throwback to the computer Dark Ages, being, as it is, a character-based, single-line editor. If any short-cuts have been made in the design of Cyber Studio, it is here.

Programs are written in Cybermate on a blank screen with an unfriendly appearance not unlike that of the MS-DOS front-end. Once written, a program can be run and checked for bugs from the interpreter via a debugging facility termed Preview. This last feature lets you run through an animation sequence on a frame-by-frame basis and at varying speeds, allowing you to make minor changes to your film.

Small loops called SEQ-LOOPS can be created from a number of frames. These can be played backwards or forwards and stopped at any point in the animation. Using some of Cybermate's primitives, it is possible to link together animation sequences, copy and repeat images, fade images in and out and superimpose one set of images on top of another. And for those people who can afford the hi-tech specs described hitherto, Cybermate can also assimilate stereo images.

At just £89.95, Cyber Studio is nothing short of a bargain. Its power and flexibility make it the design package for the Atari ST. I have only one complaint and that is about the documentation for Cybermate. Rather than include it in the roomy ring binder containing the CAD-3D 2.0 manual, Antic has chosen to store it on disk. This means that if you want a hard copy, you have to print it out yourself.

Antic's excuse is that this makes it easier to update and enhance the manual as changes are made to the program in the future. Surely it would be just as easy to replace any leaves containing redundant material with new ones. This might cause Antic bother, but it would make life easier for the consumer who has shelled out the best part of a hundred pounds.

BUSINESS MAN go HOME

PC games have been around since the launch of the original IBM PC. In those days they were not very good and they cost a great deal. People interested in playing games would invest in a machine designed specifically for that purpose. The Commodore 64 and the Atari computers were cheaper and better-suited; the IBM PC was intended instead for the office, to be used with serious software.

As with so much else in this field, it was the introduction of the low-cost PC which prompted software houses to apply themselves properly to providing games for this format. The Amstrad 1512 and the Tandy 1000 created a large market of PC home-users who wished naturally to use their computer for leisure as well as business purposes. Once the format was popularised and it was obvious that far more units were going to be shifted than previously, the manufacturers were able to reduce the prices of their games correspondingly. A game for the PC now costs about the same as for other 16-bit machines like the Atari ST.

The quality and variety of the games has improved similarly, as is clear from those reviewed below. With most of them designed for CGA cards, the graphics are about the same standard as the C64 although the sound is rather poorer when compared with that machine. For text adventures, that does not matter (Infocom has been releasing its products on the PC for many years now) but the PC will never be seen as a true games machine. Nevertheless, if you do own a 1512 or equivalent, there is a great deal of fun to be had with it.

GFL Championship Football

IBM PC
Publisher: Gamestar
supplied in the UK by Activision

One of the most exciting sports to have caught the public imagination during the past few years is American Football, the sport where the violence takes place on the pitch and not in the stands. However, despite being a smash with armchair sportsmen and women, American Football is not a game in which just anyone can participate. For starters, you need to be built like a brick outhouse and have a pain threshold equal to a lobotomized frog.

But if you secretly harbour a desire to be down on the gridiron, grunting and puffing with 'The Fridge' and the rest of the boys, put down the Budweiser, throw away the popcorn and stuff *GFL Championship Football* in the disk drive, a simulation which puts you right in the heart of the action.



● **Going for goal.**

Previous PC-based American Football simulations have been biased towards strategy and generally lacked the graphic punch for which the sport has so much potential. GFL Championship Football, though, combines strategy and animated action in a bone-crunching representation of what it is like to be both a coach and a player in a top flight American squad.

Contained in the program are the names of 28 real life teams. These are divided into eight skill categories, representing the strengths and weaknesses of their players. By studying the information provided, you can find out before committing yourself to a particular team whether, for instance, it has strong quarterbacks and receivers, or whether it is weak in these areas.



● **Attempted interception.**

Unlike Association Football, the American version is based on set offensive and defensive plays. In your role as a coach, it is your job to select the moves best suited to the strengths of your team. The names of the various plays are typically American and bear little relation to the moves they represent. This means that unless you are an afficionado, you will need to consult the manual for advice. You have to be quick, because the amount of time allotted for calling a move diminishes gradually as the game proceeds.

What really sets GFL Championship Football apart from the competition is its graphics. During the execution of a set play, you are down on the pitch, watching the action from a player's perspective. You can run to complete a pass, make a touchdown, be barged by another player or whatever; all is shown in graphic detail. The action is fast, furious, and realistic enough to make you come out in bruises just watching it.

● ***NB: These screen shots from GFL Championship Football are of Commodore versions, not the PC.***



Gamma Games

IBM PC
Publisher: Advance

People who prefer to play chess on a computer rather than on a board with palpable pieces are beyond me. I can understand playing chess against a computer for practise but what I cannot rationalise is using a computer to play against a fellow human. However, if you fall into either category, Advance's *Gamma Games* may be of interest.

Gamma Games is a compendium of chess, backgammon and something called 4-sight. The three programs come complete on a single disk and all include one- and two-player options.

The chess is straightforward and lacks the graphic flourishes other software houses like to add to their programs but which do nothing to enhance the game. After all, how can you improve a game developed over thousands of years?

The board and pieces are shown on a two dimensional display. Along the bottom of the board are written the letters A-H, each letter corresponding to a column of squares on the board. Down one side of the board run the numbers 1-8 with each number corresponding to a row of squares.

These letters and numbers combine to form coordinates which are used when moving pieces. Two coordinates must be specified before the program will make a move, since it has to know the current location of the piece to be moved and the location of the square to you would like it to be moved. It is really much easier than it sounds but it is still far more troublesome than moving pieces around a real-life chess board.

Gamma's backgammon is a decent though uninspired representation of the board game. Better is the third game in the trio, called 4-Sight. It is for two people, played on a seven by seven grid. On either side of the grid stands a man and a pile of counters.

Each player in turn designates a column on the grid, whereupon his or her man tosses a counter backwards over his head and into the next vacant square in that column. This continues until one of the players has managed to get four counters in a straight line. Although simple, 4-Sight is entertaining and, when played against the computer, very difficult.

In all, Gamma Games is a good collection of old favourites but nothing stunning. You would really be better off buying the real thing rather than these computerised pastiches which lack the charm of the table-top originals.

Amnesia

IBM PC
Publisher: Electronic Arts

Who am I? Where am I? How did I get here? Where are my clothes? These are just some of the questions begging to be answered in an unusual game called, er . . . oh yes, *Amnesia*.

Created by top American science fiction writer Thomas M. Disch, Amnesia is a text adventure set on the mean streets of Manhattan. Starting off with a completely blank memory, the idea is to scour Manhattan for glimpses of people or things which will trigger off some spark of remembrance, however slight, and help you ultimately to piece together the events which resulted in your current condition.

Amnesia begins in room 1502 of Manhattan's Sunderland Hotel, located on 53rd Street at 5th Avenue. Waking from a sleep of indeterminable duration, you get out of bed and examine yourself in a greasy mirror. The face that stares blankly back at you is not just simply unshaven but completely unfamiliar. It is as if you were looking into the eyes of a total stranger.

Before trading the safety of the Sunderland for the uncertainty of the streets, you can wander around the corridors and floors in an attempt to gather some information about yourself. The hotel's desk clerk will have a register containing your signature. Though the name you used when checking in may not be your real one, it will at least provide a useful clue.

As you wander around the hotel, seemingly unconnected images flash through your mind, and gradually cohese into a lucid portrait of your past. You remember the name of your wife (probably the last person you wanted to remember), the location of Manhattan's fashionable clothes store Bloomingdales and something about a jail sentence. But more importantly, you remember the, er, hum . . . no, it has gone. Sorry.

Exploring the Sunderland Hotel is easy compared to travelling around Manhattan. To make things a little simpler, though, Electronic Arts has bundled a map of Manhattan and a device which locates the nearest cross street to a particular street address, with the two disks containing the program. Without these, travelling about the game's 3,545 intersections and 94 subway stations, taking in nearly the complete Manhattan subway system, would be tremendously difficult.

Apart from the above, Amnesia also has a 1500 word vocabulary, meaning that it



hardly ever requests you to rephrase a command. Another nice feature is an in-built clock which changes day into night and vice versa. As darkness envelops the city, shops close, the evening news is broadcast on television and muggers come out into the open, making Manhattan a dangerous place to be out in alone at night.

Amnesia is a superb game which will keep adventurers sitting bleary eyed at their computers way into the small hours. It is very addictive, not least because of its unusual storyline. In fact, Amnesia is one of the most inventive text adventures I have seen, and ranks beside some of the best programs produced by that other great software house, Infocom. We can only hope that Electronic Arts has other games like it lined up for future release.

Shogun

IBM PC
Publisher: Virgin Games

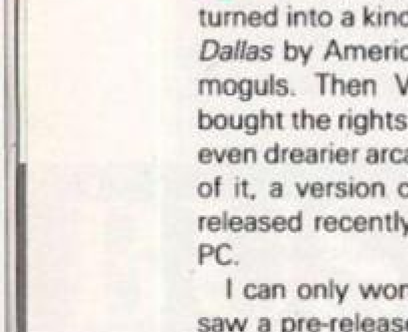
Poor James Clavell. First, his book *Shogun* was turned into a kind of Japanese *Dallas* by American television moguls. Then Virgin Games bought the rights and made an even drearier arcade game out of it, a version of which was released recently for the IBM PC.

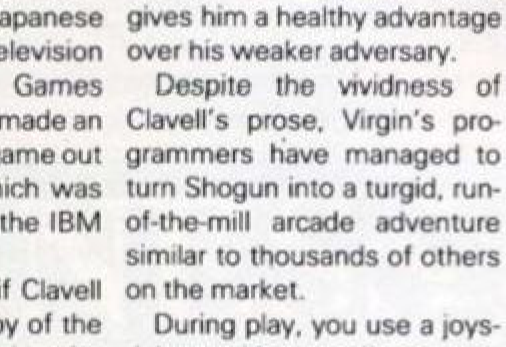
I can only wonder if Clavell saw a pre-release copy of the latter, prior to it entering the shops because if I had been him, I would have tried to prevent it being released. On the other hand, Clavell might have considered any royalties payed to him by Virgin sufficient remuneration for any damage done to his reputation by the game.

Shogun, for those who have neither read the book nor seen the TV series, tells the story of John Blackthorne, an lord whose ready supply of money and fighting ability gives him a healthy advantage over his weaker adversary.

Despite the vividness of Clavell's prose, Virgin's programmers have managed to turn Shogun into a turgid, run-of-the-mill arcade adventure similar to thousands of others on the market.

During play, you use a joystick to guide a small representation of your character through a mélange of 128 not-very-well-drawn screens. In several of these there is apparently no distinction made between the ground and the sky. I found it possible to move my character anywhere on the screen, whether he be on the ground, in the air or whatever; only buildings and other such fixed obstacles tended to block movement.





Englishman shipwrecked off the coast of Japan in 1600. This was a year of civil and political unrest in Japan and Blackthorne found himself caught up in a struggle for supremacy between numerous would-be rulers.

In Virgin's rendering, you adopt the persona of any one of 40 individual characters, including Blackthorne, with the objective of making that person the supreme military ruler of Japan, the eponymous Shogun.

How much difficulty you have in attaining this goal depends entirely upon your chosen character's station in life. A peasant or servant, for instance, will have a far tougher struggle than a warrior.

Shogun has icon-operated functions for performing the usual adventure-type actions like talking to other characters, fighting, and picking up/putting down objects. it even has a facility for bribing people to help you. Less venal characters require only that you befriend them before they will come into your service.

Considering the excellent material they had to work with, Virgin's programmers have made a hash of what could have been a very good game, if only they had stuck to the spirit of Clavell's novel. As it stands, the computer Shogun is dull and uninventive, and certainly not up to the same high standard of some of Virgin's other computer games.



The Chessmaster 2000

IBM PC
Publisher: Electronic Arts

The Software Toolworks' *Chessmaster 2000*, published by Electronic Arts, is one of the flashiest and cleverest programs of its kind you are likely to come across. It has everything, including a 3D board which can be rotated to display the current state of play from almost any angle.

But it is not just the graphics which have earned Chessmaster 2000 widespread interest from the computer chess-playing fraternity. Some readers may already have read about its crushing defeat over Sargon III, the program which reigned supreme over nearly all other micro-based chess programs. However impressive Chessmaster 2000's 'reasoning' skills may be, though, they only warrant consideration if you intend to play against the computer.

Chessmaster 2000 supports twelve levels of play, ranging from novice to grandmaster. These levels are only a guide, since it is possible to make certain minor adjustments to the program's style of play which diminish its ability to make what would be termed 'inspired moves', were they made by a human.

Three styles – best, normal and coffeehouse – are included. The first means the program will always make the best move possible; the second that it will mix random moves with best moves; and the third that it will always make random moves. These also can be altered slightly by depriving Chessmaster 2000 of the option to consult its file of classic opening moves at the beginning of a game.

Games played against the computer or another person can be analysed. When analysis mode is selected, the program goes through a game, move by move, analysing the strength of each player's position. Weak moves are highlighted and substituted with the best which could have been made. Analyses made in this way can be printed for future reference.

A feature which will appeal to chess players who enjoy looking back at games played by past masters is a file containing 100 classic games dating back as far as 1620, coming bang up to date with the games played between Chessmaster 2000 and Sargon III in 1986.

Unlike some of its competitors, Chessmaster 2000 has a great deal more to offer than just another sub-standard version of the classic board game. Its analysis and teaching facilities make it an excellent tutor, whether you want to improve your game or learn chess from scratch. It also makes a formidable opponent for good players who cannot find anyone of their standard to play.

Arcticfox

IBM PC
Publisher: Electronic Arts

In Electronic Arts' *Arctic Fox*, the Antarctica provides the arena for a thrilling battle to save Earth from being colonised by aliens from somewhere called STV-7X. In a scenario echoing 'War of the Worlds', a group of aliens has landed on Earth and constructed towers which will alter the planet's atmosphere to match that of STV-7X.

The extraterrestrials' one weakness is the Main Fort, a massive edifice at the centre of their operations; destroying the Main Fort would end the alien hopes for world domination, so it is protected by an extensive force field. This is incomplete, however, since a place must be left for incoming and outgoing craft.

Only one vehicle has the fire power necessary for an attack on the frozen encampment, and you have it. The Arctic Fox is a high-tech battle tank specially designed for the kind of conditions encountered in the Arctic. It has an onboard radar system, a cannon, a cache of land mines and numerous guided missiles. If used properly, the aliens will never know what hit them.

During the game, you are sat at the controls of the Arctic Fox, watching the outside world through a large window. On a control panel below the window are a number of icons for initialising the Arctic Fox's weapons systems, radar and for putting the craft into reverse if the action should get too hot.

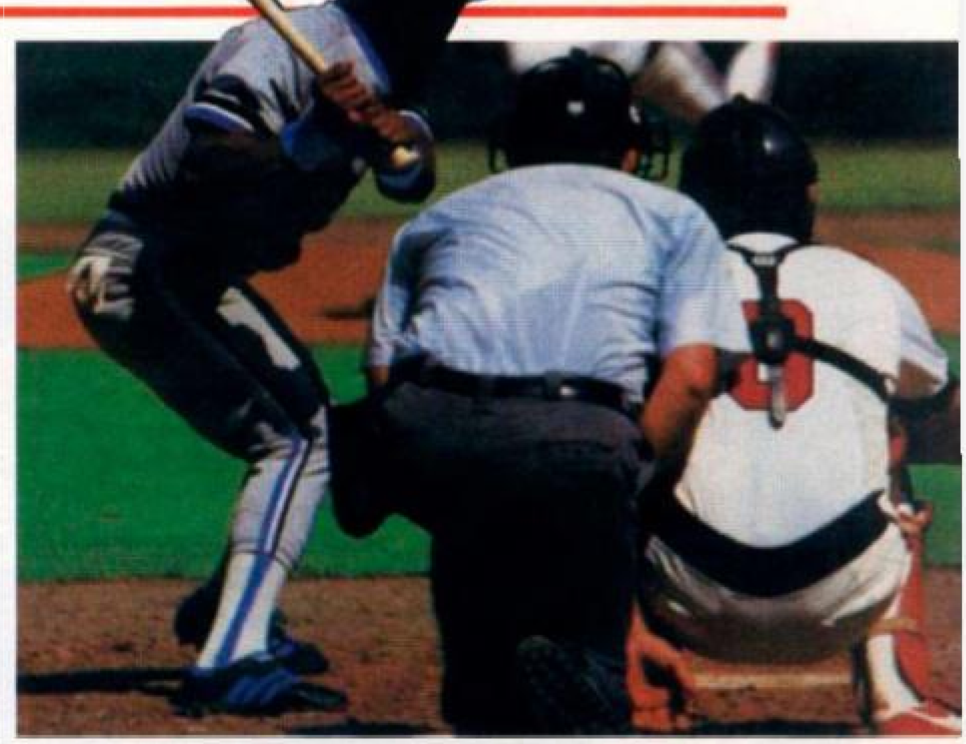
A small television in the middle of the panel provides an aerial view of the surrounding land, including the positions of alien craft not obscured by objects. This television can also be used for displaying the view behind the Arctic Fox. When a guided missile is fired, the TV turns into a kind of flight simulator, where the view is that taken by a camera located in the missile's nose. Using this, you can guide a missile directly to its target.

As you near the enemy encampment, various types of craft attack from all quarters. These are shown in the window as solid, three dimensional figures which move smoothly at stunning speeds. Only having seen Arctic Fox on the Amiga before, I was impressed with how well Electronic Arts has managed to reproduce many of the same graphic effects from that version on the IBM.

Apart from the aliens, nature also threatens to upset the mission. Constant electrical storms and blizzards often make the going increasingly tough and a profound rift running close to enemy headquarters poses an obstacle which must be navigated with extreme caution. I steered the Arctic Fox into the rift several times when playing the game, always with fatal consequences.

Arctic Fox is a superb action game with plenty of thrills and spills to keep even the most demanding, joystick-toting arcade fanatic absorbed for several hours at a time. A redoubtable example of the shoot-'em-up genre.





Championship Baseball

IBM PC
Publisher: Gamestar
supplied in the UK by Activision

Baseball is not a sport we see or hear much about in the UK. That said, it is attracting a great deal of interest and no doubt will become just as popular as American Football in a year or two. If you do not want to wait that long and have an IBM PC, Gamestar's *Championship Baseball* provides an excellent substitute for the real thing. Like that company's *Championship American Football*, it puts you where the action is.

Championship Baseball is a series of brilliantly animated sequences. What Gamestar has achieved in all its programs is magnificent and this one is the best. Once again, the display is divided into two windows. The left shows an overhead shot of the baseball diamond, complete with animated players, while the right contains a view from behind the batsman or hitter.

In a game you get the chance to be the hitter, pitcher and fielding players. Using a joystick or the computer keyboard, the hitter can be made to swing his bat in two different ways, the pitcher can throw the ball eight different ways and the fielders can run, catch and throw the ball.

The set-up of the game is much like that of Championship American Football in as far as teams can be made up either from pre-programmed players or custom players designed to excel at a particular skill. A batter, for example, can be defined as either a liner or a slugger, depending on what you want his hitting style to be.

Pitchers are rated in three categories, comprising speed, control and stamina. They are rated on a scale of one to three for each category, although the aggregate of all three cannot total more than 6.

The highlight of Championship Baseball is undoubtedly the batting sequence. The throwing action of the pitcher is beautifully animated, as is the image of the hurtling ball.

As the batter, you have to time your swing to perfection, otherwise you hit above the ball or below it. Although it is difficult to tell how far you have hit the ball in the right window when you do actually make contact, the left-hand aerial shot provides all the information you need to start a run around the diamond.

BUYING A POWERFUL PERSONAL COMPUTER IS NO LONGER A BIG ISSUE.

OR A BIG DEAL.

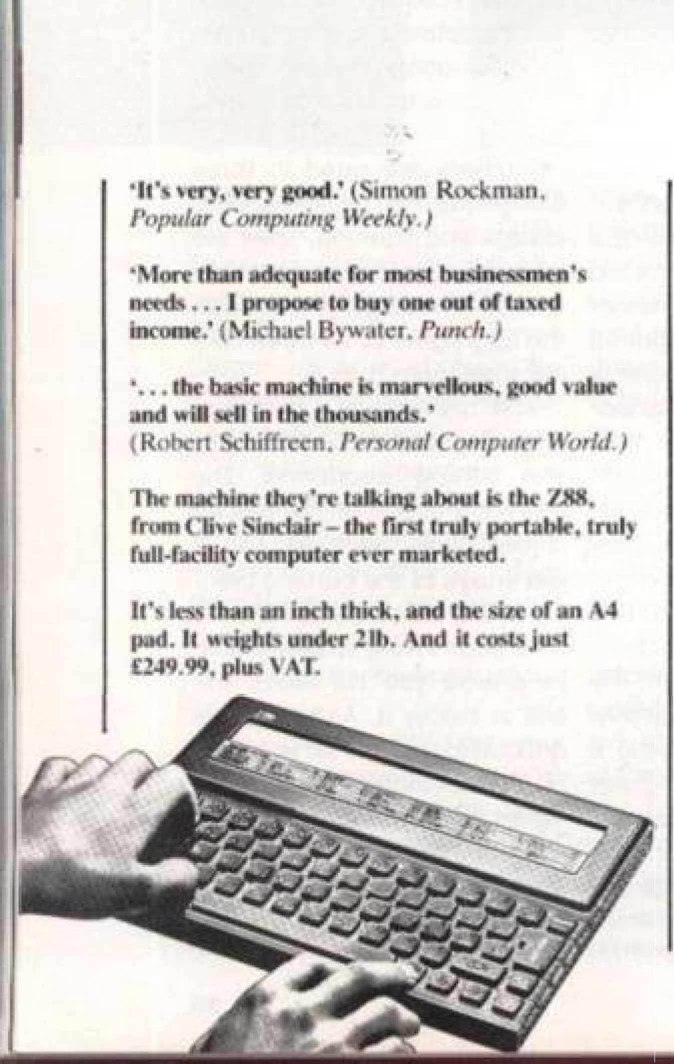
'It's very, very good.' (Simon Rockman, *Popular Computing Weekly.*)

'More than adequate for most businessmen's needs . . . I propose to buy one out of taxed income.' (Michael Bywater, *Punch.*)

'. . . the basic machine is marvellous, good value and will sell in the thousands.' (Robert Schiffreen, *Personal Computer World.*)

The machine they're talking about is the Z88, from Clive Sinclair – the first truly portable, truly full-facility computer ever marketed.

It's less than an inch thick, and the size of an A4 pad. It weights under 2lb. And it costs just £249.99, plus VAT.



Until now, a portable computer has been a computer you *can* carry with you. The Z88 is a computer you'll *want* to carry with you.

Wherever you are . . . at home, on the move, in meetings, in hotels . . . with the Z88 you can compute or word-process instantly.

The Z88 comes with 32K of RAM built in, of which around 20K is available – enough for about 2,000 words of text. This is easily expandable to 416K by simply slotting in solid-state RAM packs. And with the coming introduction of 1 Mbyte packs, total RAM of 3 Mbytes will be available – enough to hold the complete works of Shakespeare.

The resident software includes a highly powerful integrated word-processing and spreadsheet package.

Word-processing includes multi-column layout, global search and replace, and embedded calculations. Spreadsheet includes text-handling and sorting. The display shows bold, italics, underlining, and page-breaks.

But to make a portable computer a genuine tool for personal productivity, it should provide more than word-processing and spreadsheet applications. If you're getting rid of paper, get rid of *all* your paper.

So the Z88 includes a database, calculator, free-form diary, calendar, and real-time clock and alarm. (When you put the Z88 in your briefcase, you can take just about everything else out.)

The operating software allows you to switch instantly between any of the built-in applications – such as word-processing and spreadsheet – without the delay of loading separate software into the computer's memory. With the Z88, it's just a matter of pressing a couple of keys.

New dimensions to computing, from Clive Sinclair.

Despite its compact size, the Z88 has a full QWERTY keyboard with virtually silent, short-travel keys. It includes special function keys, such as ◇, □, INDEX and MENU, which



Z88. £249.99 +VAT

make it exceptionally easy for novice users to find their way quickly around the sophisticated built-in software.

The screen is a state-of-the-art supertwist LCD, which provides a massive improvement on normal displays in both contrast ratio and viewing angle – providing a clear, sharp read-out. The screen provides a large working area of 8 lines × 94 characters.

The remainder of the screen consists of sections which hold menu details (including all the Z88's commands); a unique page map (which shows you where you are on a complete page); diary date; filing and directory details; and operating system details which give you information on the Z88's status (such as battery strength).

From the start, the Z88 was designed to incorporate every reliable idea that contributes to genuine portability. These include:

ASCII files import/export facility between the Z88 and IBM-compatible PCs (version for BBC PCs coming soon) . . .

Connection to any popular printer via a built-in printer editor and RS232 cable . . .

A serial-to-parallel converter cable for connection to non-serial printers . . .

Permanent storage on slot-in EPROM packs – up to 416K now, 3 Mbytes soon – means no moving parts, no vulnerable disks . . .

Power-saving technology to provide 20 hours active use from four AA batteries (and one year on standby) . . .

Built-in capacitor to preserve data when batteries need to be changed (mains adaptor also available) . . .

BABT-approved modem, coming soon . . .

Programming language is BBC BASIC, and the Z88 screen provides extensive graphics capability.

All this, with a comprehensive manual and carrying case. And all for a basic price of just £249.99 plus VAT!

See, try, buy the Z88 now . . . at Dixons or Comet.

The Z88 is available now. Mail-order customers have been using it for months. Now it's in the High Street – at Dixons and Comet, everywhere.

Look in, and try it for yourself. And see why, at £249.99, so potent a personal computer is no big deal.

Available from DIXONS AND COMET, NOW.

CAMBRIDGE
COMPUTER

IBM TM of International Business Machines

Computer Music at it's best...



MIDI INTERFACE

For ZX SPECTRUM - Compatible with 48/128k/+2

- MIDI DELAY FACILITY • STORES THOUSANDS OF NOTES
- MIDI IN/OUT/THROUGH • FULL MIDI COMPATIBLE ASSIGNMENTS
- CONTROL ANY MIDI COMPATIBLE INSTRUMENT
- FORWARD AND REVERSE SEQUENCE PLAYBACK
- REAL OR STEP TIME INPUT FROM INSTRUMENT OR COMPUTER
- SUITABLE FOR HOME OR PROFESSIONAL USE
- FULL SYNC FACILITY • 8 TRACK MIDI SEQUENCER
- COMPLETE WITH HARDWARE / FULL SOFTWARE
- TRANSPOSE FACILITY • MICRODRIVE COMPATIBLE
- COMPREHENSIVE INSTRUCTION MANUAL
- MIDI LEAD INCLUDED
- EXCEPTIONAL VALUE

128k/+2 to Midi Lead (BT style plug to 5 pin DIN) **ONLY £9.75**

Extra 5 pin DIN to 5 pin DIN Midi Leads **ONLY £4.99**

SOUND SAMPLER

For ZX SPECTRUM - Compatible with 48/128k/+2

- SAMPLE ANY SOUND • SYNC FACILITY • MIXING OF SAMPLES
- SUITABLE FOR HOME OR PROFESSIONAL USE • SIMPLE TO USE
- REPLAY AT VARIOUS PITCHES FORWARDS OR BACKWARDS
- POWERFUL EDITING FACILITY • ECHO, REVERB ETC.
- SAMPLE SOUND EFFECTS INCLUDED • COMPLETE SYSTEM
- EACH SAMPLE SOUND STORED AS FILES IN MEMORY
- BANDWIDTH-AN AMAZING 17.5KHz
- OUTPUT THROUGH MOST HI FI'S • MICRODRIVE COMPATIBLE
- GRAPHICS SAMPLE DISPLAY • PLAYBACK FROM KEYBOARD
- REALTIME PITCH HARMONISER

Dog barking, Glass breaking, Drum beating, Car revving even make your voice sound like Mickey Mouse — it's all possible with this amazing add-on from Cheetah





SPECDRUM/AMDRUM

Digital Drum System for the Spectrum 48K 128K +2 and Amstrad 464.664.6128.

As featured on **"Micro Live"** and **"Saturday Superstore"**

- 8 DIGITALLY RECORDED REAL DRUM SOUNDS
- SIMPLE TO USE – UP AND RUNNING IN ONLY MINUTES
- A TRUE DIGITAL DRUM MACHINE
- 'REAL TIME' OR ON SCREEN PROGRAMMING
- COMPLETE WITH SOFTWARE
- EXTRA SOUNDS CAN BE LOADED FROM TAPE
- CREATIVE, EDUCATIONAL AND FUN
- THE MOST EXCITING PERIPHERAL EVER DEVELOPED
- DYNAMIC FILING SYSTEM — STORE OVER 1000 PROGRAMMED RHYTHMS
- SONGS CAN BE SAVED ON TAPE
- TAPE SYNC FACILITY
- POLYPHONIC • COMPREHENSIVE MANUAL
- JUST PLUGS IN TO MOST HI FI'S

NOW AVAILABLE
Latin Kit & Editor £3.99
Electro Kit & Editor £4.99
Afro Kit & Editor £4.99

Prices include VAT, postage & packing. Delivery normally 14 days.
Export orders at no extra cost. Dealer enquiries welcome.

Cheetah, products available from branches of Dixons Harrods Lasky's WHSMITH High St. Stores and all good computer shops or direct from Cheetah.

128 to Midi Lead available now at.... £9.75

Cheetah Marketing

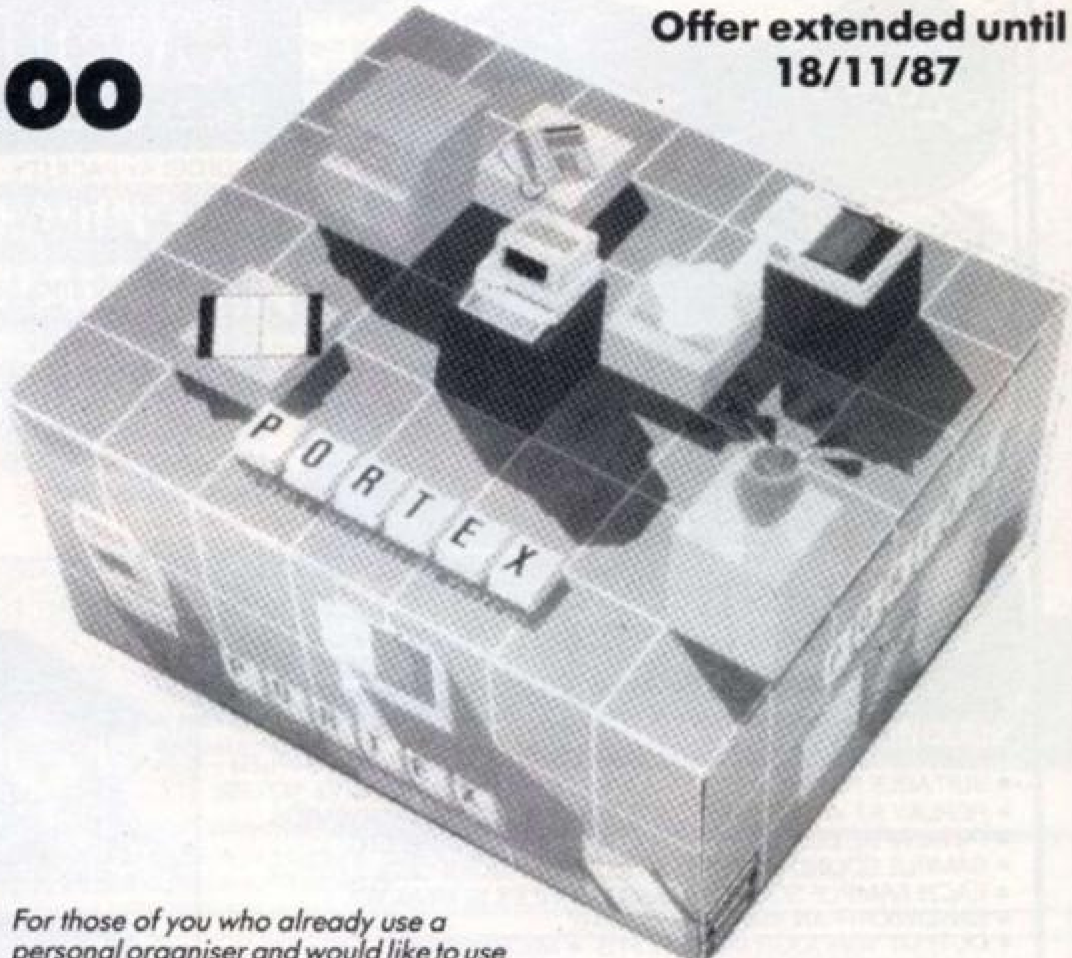
CHEETAH MARKETING LTD
Norbury House, Norbury Road,
Fairwater, Cardiff CF5 3AS.
Telephone: Cardiff (0222) 555525
Telex: 497455 Fax: (0222) 555527

PORTEX PERSONAL ORGANIZER

m.r.p. £99

ONLY £89.00

Offer extended until 18/11/87



Style with Efficiency

Focus Magazines in conjunction with the makers of PORTEX are pleased to offer readers a chance to purchase this exciting package at a special price for a limited period only.
With Portex, your information will always be where you want it – safely stored on your computer AND in you pocket!

The powerful word processing facility contains all the usual features you would expect from a high quality program, including Mailmerge and automatic spellcheck, as well as over 2000 help screens.

It allows you to set appointments and reminders over any period of time, as well as changing them to adjust to sudden changes in schedule. The self-sorting address book is easily adjustable to any format and powerful commands allow you to interrogate the comprehensive directory providing the information you need at the touch of a button.

For those of you who already use a personal organiser and would like to use the Portex program to insert personalised information into your binder, there is a special pack which substitutes extra paper, specially configured to fit the main brands, instead of a binder so you can use your own.



SAVE £10

WHAT YOU GET

- Portex reference manual and slipcase
- Portex binder made of fine Italian leather
- Address and subject dividers
- Three 5.25" or two 3.5" diskettes for IBM PC or compatible, containing Portex and example files.
- Portex function key template
- Starter pack of fine white multi-perforated Portex paper in two styles pre-punched ready for your diary or address book.

You or your company need never buy another diary.

Portex lasts for life!

TO ORDER, SIMPLY FILL IN THE COUPON

HEADLINE COMMUNICATION

Headline Communication in conjunction with Which PC offer readers a chance to purchase from its superb range of REELTIME self tuition programs at a very special price. This is a complete, professionally designed training course comprising audio tapes and a disc containing a true working example of the software you will be using. Save yourself hours of frustration poring over the manual and make full use of today's powerful software programs from day 1.

The Complete Introduction to . . .

Desktop Publishing

Makes this new way of presenting printed information both easy and fun. Includes a working copy of the top quality DTP program Lasar Maker for training and practice later.

IBM PC/XT/AT & Compatibles.

Designed for anyone starting with computers on a PC or compatible. Includes the Tinysoft Starter software suite of word processor, database and spreadsheet, with emphasis on DOS.



Amstrad PC 1512

Similar to the PC package but includes mouse etc.

Locoscript

Written in a friendly style, the easy way to master word processing on the Amstrad PCW.

The PCW Computer

Exploit the full power of your PCW. This tuition program will teach you how the CP/M operating system can take you beyond the simple word processing capabilities of locoscript.

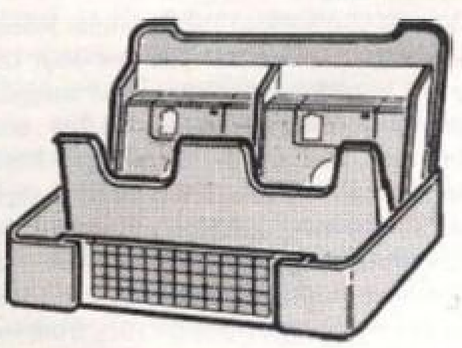
MRP £34.44
OUR PRICE £32.14

To order, just tick the appropriate box on the coupon.

YOUR COMPUTER WAREHOUSE

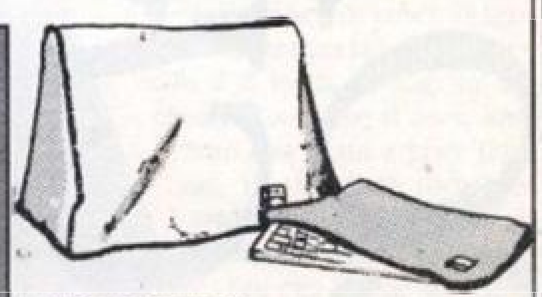
3″ floppy discs
5 for **£14.00**
10 for **£28.00**
3″ disc library case
(holds 8-10 discs) **£5.95**

COMBINATION BARGAINS
Library case + 5 discs **£19.00**
Library case + 10 discs **£33.00**



Your Computer offers readers a chance to purchase any of the following items from the list below. Special savings on combinations. Just fill in the coupon and tick the appropriate boxes.

U.K. Postage & Packing **£1.00**
Overseas **£2.00**



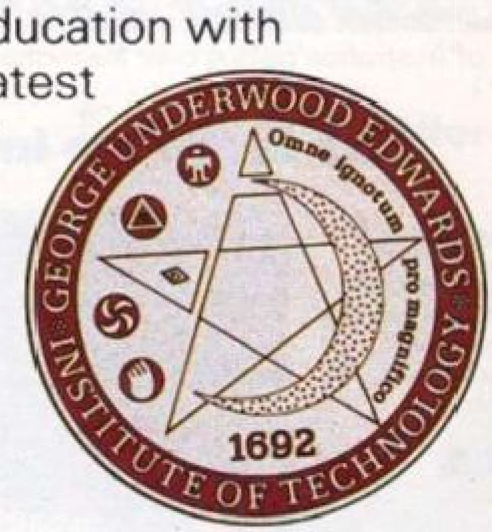
DUSTCOVERS

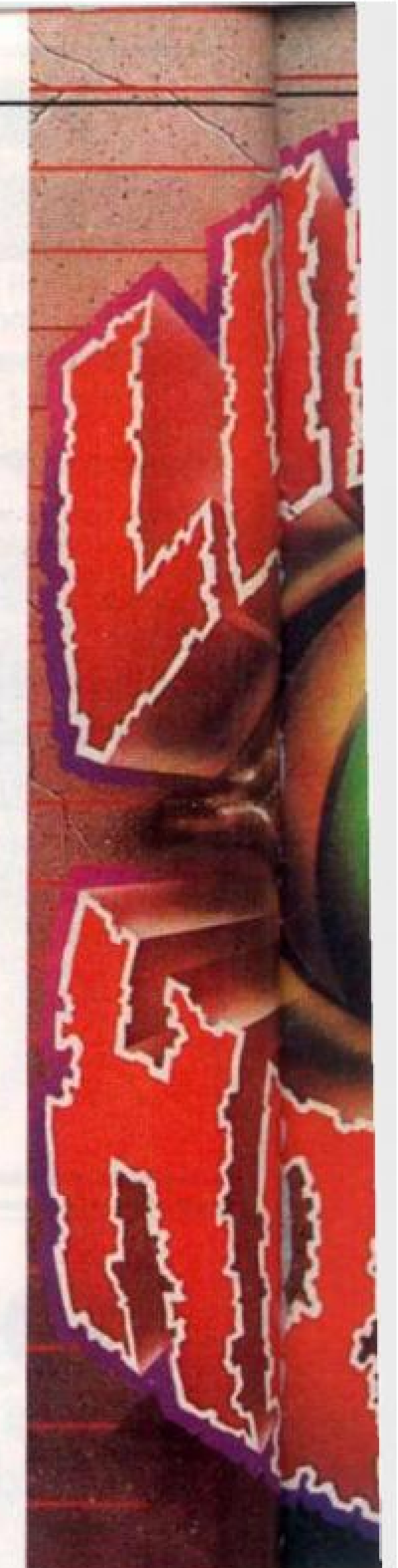
The PCW three piece set is soft grey and the two piece PC set in elegant blue.
PCW set **£ 9.95**

PRINTED ON PAGE 66

COLLEGE CREEPS

Miss those happy-go-lucky student days? Relive the dream of further education with Infocom's latest blockbuster





The Lurking Horror
(A) £24.99
(B) £29.99
(A) Atari XL/XE, CBM64, Amstrad CPC and PCW
(B) Apple II, Macintosh, Atari ST, Amiga, PC, MS-DOS compatibles
Publisher: Infocom

● Things are not what they seem at the Institute of Technology

It's the end of term at the George Underwood Edwards Institute of Technology, you have a classics paper to write by tomorrow and all the TechNet terminals in the dorm are occupied. Undeterred by the raging blizzard outside and the recent mysterious disappearances, you set off for the Computer Centre.

You try not to think whether calling a place the Terminal Room has any special significance, you just greet the hacker who returns at once to his patented hacker's "hunched-over-the-keyboard" position and you sit down at the whiz-bang beyond-state-of-the-art PC. You log in and give your password. A few clicks on the mouse and up comes your paper for editing. It's got to be finished tonight.

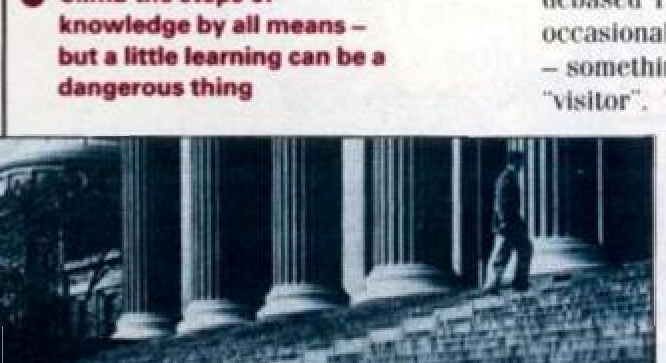
Wait a minute. You can read the title but the rest is a combination of incomprehensible gibberish, latinate pseudowords, debased Hebrew and Arabic scripts and occasional disquieting phrases in English – something about a "summoning", and a "visitor". What is this? Page three has some queasy woodcut carvings and the same script as before, but this time laid out as a poem with an attempt at translation beneath. *His place must be prepared . . . Call him forth with great power. Only an acceptable sacrifice will call him forth. He will be grateful.* The fourth page is a photograph . . . is that a mouth you can see, and if so, what's in it?

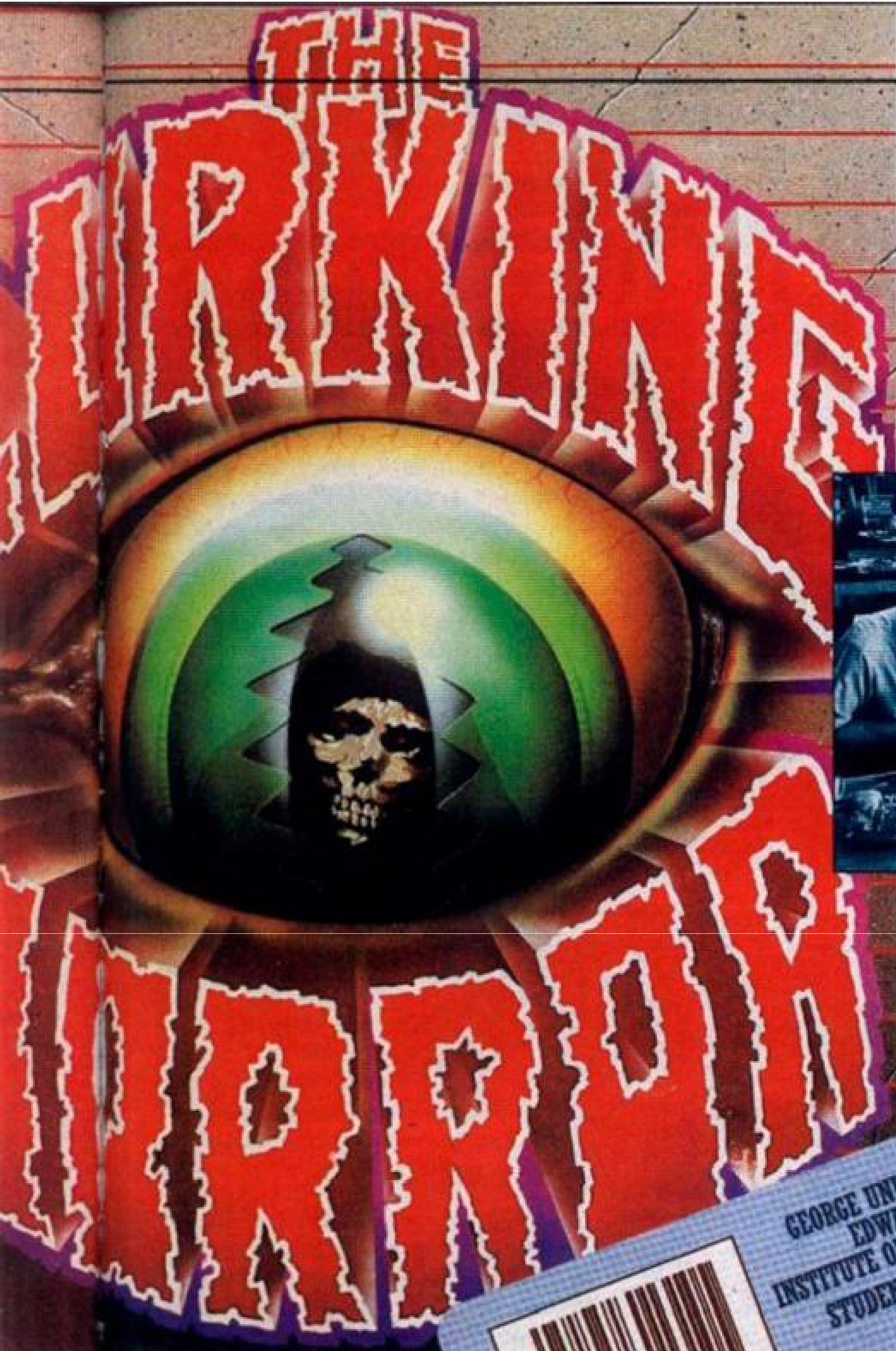
You faint and awake in a place with a broken rocky surface . . . a path descends into a shallow bowl of black basalt . . . a noise draws you down into the bowl . . . dim shapes crowd you on all sides . . . ahead is a rock platform containing a stone . . . you take the stone . . . behind you a hideous creature emerges, questing the stone . . . it takes you in its mandibles . . . the stench is overwhelming . . .

You awake back in the Terminal Room. Your head clears, and you see that the screen is nothing but snow and unusual characters. You summon the hacker, who takes one look at the screen and says, "Losing, huh?" You daren't try to explain what's happened, but ask him to check the program. He hacks in and tells you that you've lost your assignment file. The directory got mixed up with some files from the Department of Alchemy and maybe you ought to go down there to see if you can recover your paper. Maybe you should.

The hacker laughs at something on the screen. Who would call a mode Lovecraft

● Climb the steps of knowledge by all means – but a little learning can be a dangerous thing







Right lads, who's got the new copy of *Men Only?*



I *hate* this canteen food

Mode, he asks, and returns to his own machine. You reach into your pocket to check that your assignment is still there . . . you discover a smooth stone that you know you didn't have before.

Going out to the kitchen you look in the fridge and discover a carton. Though it contains Chinese food, the writing on the top isn't Chinese or English or any language you recognise. But there is a familiar-looking symbol there. You take out the stone, and see it has an identical symbol carved on to it.

You go out onto Smith Street. Isn't the Department of Alchemy way over to the south of the campus, off River Street? You check the map in your *G.U.E. at a Glance: a Guide for Freshmen*. But outside the blizzard still howls and the snow swirls around your feet, so you return to the warmth of the building. Isn't there a way through the basements to some of the other departments? You go downstairs to take a look round. Yes, here's the basement for the Aerospace building. That's the wrong direction, however.

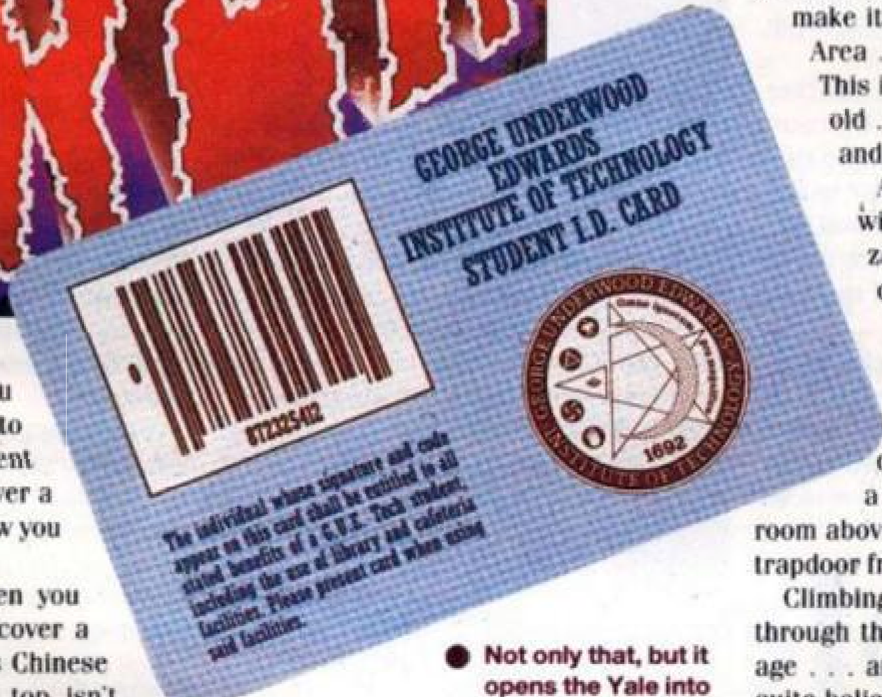
You go east instead, through to the temporary basement. Someone's left a pair of electrician's gloves and a crowbar lying around. What's beyond the temporary basement? Just pitch dark. Lucky you found that flashlight upstairs. Not that you're scared of moving round in the dark, of course. You just don't want to bump into something.

Hey, this is the Dead Storage Area. Just look at this junk. So much garbage you can't even get by. There must be another passage through, if you could just make it over . . . this calls for some serious junk-shifting. Quite a job, but eventually make it and beyond the Dead Storage Area . . . the Ancient Storage Area! This is all the stuff that's older than old . . . it's even older than mould, and there's plenty of that around.

A closed manhole cover. Is this wise? Better than facing the blizzard if it leads through to Alchemy. You force it open and climb down into a brick tunnel. To the south there's a cinderblock tunnel with a ladder leading up to a trapdoor. You can lift the trapdoor a few inches and see a lab in the room above, but something's stopping the trapdoor from opening further.

Climbing down again you walk back through the brick tunnel, along the passage . . . and you step out, your eyes not quite believing it, into a renovated cave of some kind. Down in the centre of the cave is a slab of granite. Stepping nearer you can see it must be used as an altar in some way . . . it's carved with symbols, one of them familiar to you from the stone, but most of the others are obscured by rusty red stains . . . nearby is a sharp thin-bladed knife. There's an iron plate embedded in the floor, and it has strange upwardly protruding dents in it as if made from below . . . you slide open the plate . . . a low gutteral groaning and snarling issues from the opening . . .

Mike Gerrard

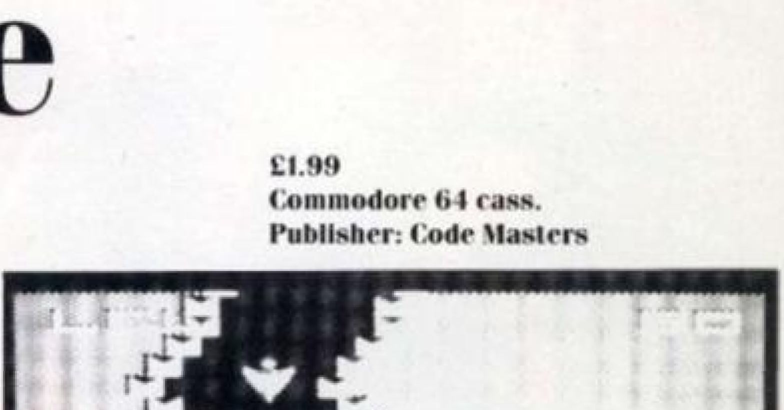


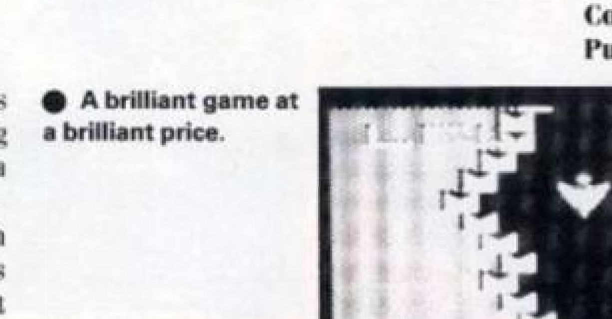
Not only that, but it opens the Yale into the girls' dormitory

Lazerforce

£1.99
Commodore 64 cass.
Publisher: Code Masters

● **A brilliant game at a brilliant price.**





● **The title screen of Lazerforce.**

Judging by the name, I think you can guess that we have an 8-level vertically scrolling shoot-'em-up here. As usual, there is a multitude of 'orrible aliens to massacre.

The first part of a level is the main attack, and what an attack it is! Even pros will have trouble with this sheet. Apart from the main aliens you have to be careful with the landscape too. Sometimes it's a scrolling obstacle course, at other times it'll be giant shields extending out to form massive walls. There are signs marked 'WOP' which, if picked up, will give you three shots per bullet instead of two. There are also the standard smart bombs which destroy every sprite on the screen.

Once the first attack is over, you are dropped into the 'Guardian Zone'. Here you have to blast things in a general way to survive. This sequence is very similar to the arcade game *Centipede*. You can still use the smart bombs and wops are freely available. You have to destroy four of them to get to the next section.

The next screen gives you the challenge of docking to refuel, using fire for thrust. If you mess up the docking you don't lose a life but no bonus is given at the end of the level. The third and final bonus screen is the speed tunnel, which is fairly self-explanatory. The faster you go, the more points you get. Simple!

After the disastrous *Thunderbolt*, Gavin Raeburn has finally hit the mark with a graphically excellent, addictive and enjoyable shoot-'em-up. The landscapes are excellently drawn, coloured and animated, my own favourite being the fire corridor (just like *Salamander*). Some of the sprites are really funny to watch, such as the giant caterpillar creatures in later bonus levels and also the vicious flying pizzas (honest!) and the indestructible eggs in the Centipede sheet. The sound FX are great and very varied, and there is a good title screen tune too. The title screen smooth scroll is very clever, but what does the tape motor option do?

A brilliant game at a brilliant price. Buy it today.

Kenneth Henry

Marble Madness

Commodore 64: £9.95
Commodore disk: £12.95
Commodore Amiga: £19.95
Atari ST: £24.95
IBM PC: £19.95
Publisher: Electronic Arts

Marble Madness is in the vanguard of the games released by Electronic Arts in its attempted conquest of Europe. With software like this, I have little doubt that we will all soon be helplessly enthralled and en-thrilled subjects, quivering with delight under the dominion of the masterful EoA. Marble Madness is mesmerizing.

The game is already available in this country through Ariolasoft on the Commodore 64 and the Amiga but it is now to be joined by conversions for the IBM PC and the Atari ST. Your humble reviewer tested Marble Madness on the PC which, let's face it, is not a games machine, but even through this inferior medium playing the game was an exciting experience.

It is true that the sound is a little on the tinny side, lacking the stereophonic delights of the Amiga sound chip. My suggestion is that you turn the sound off the PC altogether and fill the empty aural space with Mozart's Greatest Hits or some such disk on the gramophone instead. Turn the lights down low, pour out a dram of something intoxicating and set yourself to play.

The beauty of Marble Madness is that it is so simple. The program loads itself and then you find yourself with a game which has one easy rule: go for goal. Using either joystick or keyboard controls, you have to guide a marble through a maze of alleyways, bends, chicanes and tunnels, avoiding the occasional black hole and a maverick black marble which rolls on to the screen from time to time to knock your own specimen off its path.

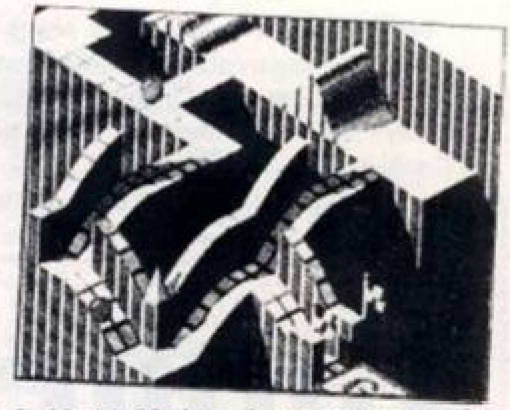
The goal at the end of the first level is easy to find, the second takes a little practise, as does the third and then you move on to a second disk where contending with unexpected twists and turns becomes a lot more difficult. I haven't managed yet to progress beyond the fifth level after several hours of application but I am not the world's most dextrous person so this is not a reliable index to the game's degree of difficulty.

The editor of *Which PC?*, however, is a much more able fellow than I and he informs me that there are one or two more levels, including a secret one. When you get that far in the game, all sorts of strange things start to happen with a certain amount of inverse logic required to make the joystick do what you intended. Once through that little lot, you have to start all over again with the marble moving at a much more frantic pace and with more gremlins springing up to knock you into oblivion.



If you've got any friends, you can play Marble Madness with them too. Two players compete to be the first down the slippery slopes whilst attempting to knock each other off the path. A points system tells you who is winning the race.

EoA undoubtedly has a winner here. The game is mindless but not degrading. It doesn't involve shooting everything in sight, a pursuit which is viewed as increasingly distasteful after recent events in the real world. My only reservation is that with a boredom threshold inevitable in such a non-intellectual game (although I must say that I have not yet reached it myself), the potential punter must consider carefully whether he or she is going to enjoy sufficient mileage from the program to justify an outlay of up to £25. This qualification notwithstanding, Marble Madness is entertainment of the highest calibre.



● **Marble Madness is entertainment of the highest calibre.**

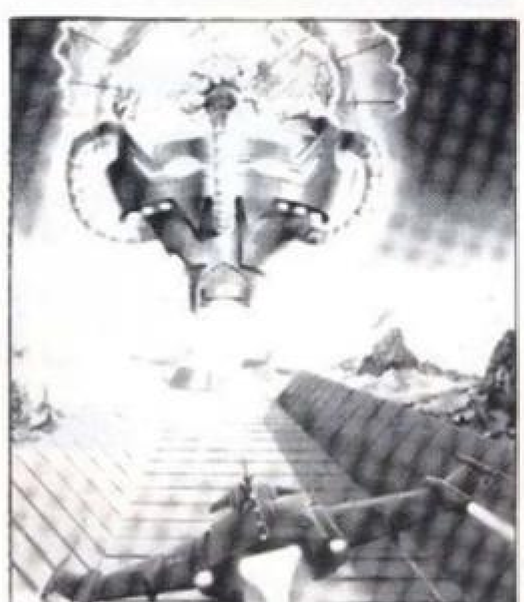
Raphael Sergei

Tracker

£19.95
Atari ST
Publisher: Rainbird

It has become a cliche for reviewers to lambast the quality and quantity of packaging surrounding many of today's games. Oh for the days when all you had to do was stick a cassette into a player, press play and five attempts and several hours later settle into a rewarding assault upon the alien hordes. Now that even humble Spectrums come equipped with disk drives which load games while you blink, what do the software companies do? Put out games with all sorts of rubbish in the box, all of immeasurable significance for the game you would be playing if you could work out what that significance was.

Rainbird, the publisher of *Tracker*, is an offender in this matter. Simple instructions are obviously not good enough for trend setters and market leaders; instead, on opening the familiar blue box, you are confronted with not even a mere booklet, but a James Follet short story. Its brevity is perhaps its only asset. Having encountered the Starglider novella I decided to pick up the keyboard control, load the game and try my luck.



● **Tracker is Rainbird's first disappointment.**

I did not have much. There are four screen sections, the two central ones containing maps of a maze, and the two at the side detailing status, number of lives left and score along with quit and pause options. Taking my first life in my hands I entered combat mode: one map vanished to be replaced by a view of a hexagonal room with no exits visible and a blue space craft sitting there. I shot it only to realise that rather than increase my score I had succeeded only in ending my fifth life before my first.

Cursing, I turned to Tracker the story. It seems the maze is a former Egronian training ground, now home of an alien version of Krypton Factor where combatants try their luck against the maze and inevitably perish watched by a declining percentage of the Egronian empire. When outlaw trader Dreg brings Novenian beauty Tallis to enter the game, its loathsome producer is too pleased to realise that in the very next edition Tracker will be over for good. This would all be very well if it were not for the fact that Follett can only create characters aided by sexism which would be crass if it were not so laughable. I am happy to

TRACKER continued

believe that a character is really mean without being treated to a tedious list of his sexual exploits, thank you very much. And there isn't anything hard about hunting endangered species either.

Rousing myself from deep slumber it was back to the game and time to pilot my skimmer through the Tracker maze. Alas, it didn't so much skim as lurch from side to side losing precious energy in collisions with bits of maze. After a day of trying, my score stayed a determined nil and I had lost interest in further efforts. Perseverance is not my strong point, and more skilled pilots and devotees of other Rainbird games might fare better. To round up with another cliche, this one is probably for fans only.

C. F. Loder

Game Over

Commodore cassette: £8.95
Publisher: Imagine/Dinamic Software

The Spanish programming team Dinamic is back with its second project. The evil Queen Gremla has managed to enslave her own galaxy and become a powerful ruler, mainly thanks to her right-hand toyboy Lieutenant Arkos. He has seen her evil for what it really is and decided to overthrow her.

Dropping into the first planet Hypsis is where the game starts. This first planet consists of 20 screens of horizontal action (flick screen) and the overall look reminds me of the final stage of *Army Moves* with even more added irritations to try the patience of a saint! You are swamped by aliens and your character is extremely sluggish to control. You can only jump left or right, not straight and upwards like in Army Moves.

Among those 20 screens, the various enemies include the guardian robot which looks like a head and a gun on a scooter. In screen one you will encounter the first challenge. A huge green monster appears, shooting homing bullets. It needs 40 shots (or 10 grenades) to die. This screen is the only 'marker' in the whole game. After a few more screens of green monsters, you will find another challenge at the end of the first planet. Three giant grey robots have to be killed to obtain the code, and each one needs 20 shots to be killed.

Now you have the code, entering it will take you to the Planet Skunn, which is even more difficult than the first. The flick screen format makes the game play more like *Ghosts and Goblins*. Among the enemies here are Kaikas, large green kangaroos, a lesser version of the giant robots, only needing three shots this time. When you have solved a puzzle in the base, you have to find your way to the giant guardian robot. This guy needs a hefty seventy-five bullets pumped into him to complete the game. Well frankly, if the congratulatory screen is anywhere near as pathetic as Army Moves, you'll wonder why you bothered.



● You may start optimistically . . .



● . . . but soon you will wish . . .



● . . . that it was Game Over.

This is really one naff game. The inconsistent difficulty/easiness ratio in Army Moves has been removed and you'll be overjoyed to hear that now there is only total difficulty instead. Brilliant. The status scanner does nothing to dispel my theory that this is just a flick-screen Army Moves in space with hardly any improvement over the original. The big bold graphics approach has been dropped and looking at the sprites you'd think they were built from Lego. However, the backdrops are well drawn and coloured. Controlling the character is difficult, as he is very sluggish when moving (or waddling).

In the planet prison there is a bug, causing you to crash through the floor to death below. The jumping action is nothing short of ridiculous; has the character some sort of turbo-boost like Kitt?

About the only good thing is the music. Martin Galway excels himself once more with a track complete with sampled sound effects and plenty of Commodore 'click', but I won't mention what music you get on loading, nor the rather naff in-game sound effects.

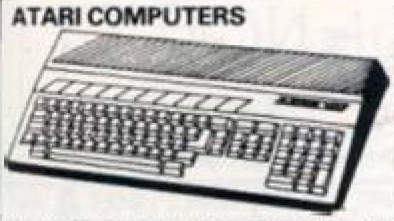
Another complaint: why has the space bar-as-second-fire system been removed? Instead you have to hold down the button to get the second weapon which means hardly any consistent bullet firing at all. I suppose this is to cover up the fact that there is only one single, solitary bullet sprite at any one time which moves at a snail-like pace for this sort of game.

It has to be said that the Amstrad version is better, as you have three bullet sprites and overall better control. If you want an exploration game with arcade overtones, buy Army Moves; compared to this it is easy. Oh yes, remember I told you that there was one game 'marker' in the first section? In that case you will also like to know that there are none on the second planet. No, not one. Even if you reach the final guardian and die, you'll be sent all the way back to the beginning of the level, which will probably send you heading for the OFF switch.

Nice graphics and excellent music, but a terrible game. If you want to perservere, it's addictive, but at the price I find it too similar to, and more frustrating than Army Moves. If you own an Amstrad, buy it now, but if you're a Commodore owner and already have Army Moves, forget it.

Kenneth Henry

ATARI COMPUTERS



All All ST computers come with mouse and software. Atari 1040STF £462 (£449) £489. 520STFM £283 (£280) £320. Cumana 1000K ST disc drives:- single £136 (£136) £152, dual £242 (£236) £260. Atari 500K ST disc drives £109 (£119) £125. Atari ST monochrome monitor £139 (£149) £198. Atari 12" medium resolution ST colour monitor £377 (£368) £419. 14" low resolution colour monitor £276 (£278) £329. Atari SMM804 printer £186 (£188) £222. Centronics printer cable for the ST range £16 (£16) £20. We offer good discounts on most ST software for example:- Hisoft DEVPAK £43 (£41) £45, Hisoft Basic Compiler £72 (£67) £71. Firstword Plus £66 (£61) £65. Metacombo Lattice C £84 (£75) £79, Computer Concepts Fast Basic £84 (£75) £79. LDW Basic ST, new basic compiler £63 (£58) £62. Psion Chess £22 (£22) £26, Sublogic Flight Simulator 2 £43 (£41) £45, Starglider £22 (£22) £26. Atari 130 XE Computer + game £96 (£99) £120.

SINCLAIR PRODUCTS AND CAMBRIDGE COMPUTERS

Spectrum 128K Plus Two computer:- without joystick and software pack £139 (£146) £176, with joystick and software pack £149 (£158) £190. Spectrum Plus 3 (New disc machine) £199 (£203) £233. Blank microdrive cartridges for the QL and the Spectrum £2.50 (£3) £4. QL floppy disc interface (See Cumana disc drive section for suitable drives) £86 (£84) £94. Spectrum floppy disc interface (See Cumana section for suitable disc drives) £76 (£76) £86. Spectrum centronics printer interface and cable £46 (£42) £47. Cambridge computers Z88 £295 (£327) £343. Mains adaptor £10 (£15) £20. 128K ram cartridge £50 (£57) £58. 32K ram cartridge £13 (£17) £19.

PSION ORGANISER

Organiser II CM £93 (£94) £104. Organiser II XP £125 (£127) £137. Datapack 64K £72 (£72) £77. Spell checker £28 (£29) £31. Link up adaptors £12 (£13) £15. RS232 link £46 (£46) £52. Formatter £47 (£47) £52. Maths pack £27 (£27) £29. Finance pack £27 (£27) £29. Mains adaptor £12 (£15) £20.

COMMODORE COMPUTERS

Amiga A500 Computer + modulator + software (voucher price) £462 (£462) £512. Ram expansion £108 (£106) £111. Amiga A500 + 1081 colour monitor + modulator + watch + software (voucher price) £719 (£711) £818. Commodore 128 computer + cassette recorder + software + mouse £199 (£200) £242. Commodore 128D £418 (£408) £448. 1571 disc drive £276 (£269) £285. Commodore 64C computer £164 (£164) £189. Commodore 64C computer with mouse, cassette recorder and software £191 (£193) £223. Convertor to allow the use of most ordinary mono cassette recorders with the Commodore 128 and Commodore 64 £9.78 (£9) £11. Commodore cassette recorder £32 (£32) £38. Commodore MPS1000 printer £269 (£262) £296. 1541C disk drive £194 (£192) £208.

AMSTRAD PRODUCTS

Amstrad PC1640 computers:- ECD single floppy £867 (£866) £973, ECD dual floppy £964 (£957) £1064, ECD 20MB HD £1289 (£1257) £1364. CD single £713 (£715) £822, CD dual £808 (£805) £912, CD HD £1126 (£1105) £1212. MD single £560 (£570) £677, MD dual £655 (£660) £767, MD HD £972 (£960) £1067. Amstrad PC1512 computers:- mono single £459 (£475) £582, mono dual £567 (£578) £685, colour single £607 (£615) £722, colour dual £716 (£718) £825. DMP3160 printer £205 (£205) £238. PCW9512 computer £544 (£555) £662, PCW8512 £468 (£485) £592, PCW8256 £351 (£375) £482. Amstrad 6128:- coloiur £391 (£420) £500, green £291 (£320) £404. Amstrad DMP2000 printer £166 (£171) £204. Extra disc drive for Amstrad 6128 £99 (£105) £136. Amstrad joystick £11 (£12) £16.

CUMANA 3.5" AND 5.25" CASED DISC DRIVES WITH CABLE AND POWER SUPPLY

40/80 track switchable double sided to suit floppy disc interfaces of the Sinclair QL, Sinclair Spectrum and BBC B. 3.5" drives:- single £134 (£134) £156, dual £224 (£219) £251. 5.25" drives:- single £172 (£169) £199, dual £310 (£306) £347.

PRINTERS

Amstrad DMP2000 £166 (£171) £204. Epson LX800 £276 (£275) £309. Star NL10 £235 (£234) £270. Interfaces for NL10 £37 (£35) £37. Cannon PW1080A £303 (£298) £338.

ACORN RISC COMPUTERS

A305 £918 (£819) £869. A310 £1006 (£895) £945. Mono monitor £57 (£65) £115. Colour monitor £230 (£220) £270.

SWANLEY ELECTRONICS – The Computer Export Specialists
Dept. YC, 32 Goldsel Rd., Swanley, Kent BR8 8EZ, England
Tel: SWANLEY (0322) 64851

We give an additional discount of 2% to UK personal callers who pay cash. Official orders welcome. UK prices are shown first and include post and VAT. The second price in brackets is for export customers in Europe and includes insured airmail postage. The third price is for export customers outside Europe (including Australia etc) and includes insured airmail postage.

CADMASTER®

THE ULTIMATE GRAPHICS PACK



SUPERB GRAPHICS SOFTWARE
PLUS
A QUALITY LIGHT PEN

Discover the exciting world of creating your own graphics on screen.

Look at these options:—

D DISC OPTIONAL EXTRA
* MICRO DRIVE COMPATIBLE
S SOLID COLOURS
C CASSETTE

	AMSTRAD CPC464/664/6128 COLOUR MONITOR	COMMODORE 64/128	PLUS4	C16	VIC 20 (NEEDS SUPER EXPANDER)	SPECTRUM	DRAGON 32/64 TANDY COLOUR 32/64
FREEHAND DRAW	✓	✓	✓	—	✓	✓	✓
DRAW BOX	✓	✓	✓	✓	✓	✓	✓
DRAW CIRCLE	✓	✓	✓	✓	✓	✓	✓
DRAW LINE	✓	✓	✓	✓	✓	✓	✓
DRAW TRIANGLE	✓	✓	✓	✓	—	✓	—
DRAW RAYS	✓	✓	✓	✓	✓	✓	—
PEN THICKNESSES	1	5	5	1	1	4	1
PEN QUILLS	—	3	3	—	—	2	—
PAINT BRUSH	—	✓	✓	—	✓	✓	—
TEXT	✓	✓	✓	—	✓	✓	✓
PIN POINT ACCURACY	✓	✓	✓	✓	✓	✓	—
ACTIVE BANDING	—	✓	✓	—	—	✓	—
COPY FUNCTION	✓	✓	✓	—	—	✓	—
WASH	—	✓	✓	—	—	✓	—
COLOURS	27	16	121	121	16	8	4
FILL	✓	✓	✓	✓	✓	✓	✓
FILL PATTERNS	5	11+5	11+5	5	—	7+5	5
ERASE FUNCTIONS	—	✓	✓	—	—	✓	✓
SAVE SCREEN	✓	✓	✓	✓	✓	✓	✓
PRINTER DUMP	✓	✓	✓	✓	—	✓	—
PROGRAM FORMAT	Cs	Cs	Cs	Cs	Cs	C*	C
RETAIL PRICE	£19.95	£19.95	£19.95		£19.95	£19.95	£17.25

This powerful PROGRAM + a QUALITY LIGHT PEN and an INSTRUCTION BOOKLET in one reasonably priced package.
Easy to use by all ages for creating colourful pictures or technical drawings.
Full back-up service from the manufacturers.

TROJAN

VISA

Trojan Products, 166, Derlwyn, Dunvant, Swansea SA2 7PF. Tel: (0792) 205491

VISA

BYTEBACK

ATARI ST

GAMES	ONLY
Terrorpods	18.50
Indiana Jones	14.50
Tai Pan	14.50
F15 Strike Eagle	18.50
Skulldiggery	14.50
Sentinal	14.50
Battlezone	22.50
Road Runner	18.50
TNT	14.50
Deathstrike	11.00
Eagles Nest	14.50
Golden Path	14.50
Auto Duel	1850
Jupiter Probe	11.00
Gauntlet	18.50
Barbarian	18.50
Airball	18.50
Crafton & Xunk	14.50
Hades Nebula	17.00
Sub Battle Simulator	18.50
Prohibition	14.50
Leader Board	18.50
Arctic Fox	18.50
Skyfox	18.50
Arkanoid	11.00
Ninja Mission	7.50
Goldrunner	18.50
Techmate Chess	14.50
Silent Service	18.50
Balance of Power	22.50
Strike Force Harrier	18.50
3D Chess	18.50
Colonial Conquest	22.50
Flight Simulator 2	37.50
Mouse Trap	11.00
Timeblast	7.50
Plutos	11.00

ADVENTURES	ONLY
Knight Orc	14.50
Kings Quest 3	18.50
Space Quest	18.50
9 Princes in Amber	14.50
The Lurking Horror	22.50
Stationfall	18.50
Guild of Thieves	18.50
Beaurocracy	26.00
Leather Goddesses	22.50

ART & DESIGN	ONLY
Advanced Design Studio	18.50
Cyber Studio	69.00
Aegis Animator	63.50
GFA Draft	79.00
The Music Studio	12.50
Degas Elite	63.50
Easy Draw 2	63.50

LANGUAGES	ONLY
Hisoft Basic	63.50
Fast Basic(Disk)	35.00
Fast Basic(ROM)	69.00
GFA Basic36.60	
GFA Basic Compiler	36.50
Cambridge Lisp	119.00
MCC Lattice C	79.00
MCC Assembler	39.00

UTILITIES & BUSINESS	ONLY
Word Writer	63.50
Pro-Sound Designer	45.00
First Word Plus	63.50
K-Data	39.00
FastComm	39.00
K-Spread 2	63.50
Zoomracks 2	55.50
Publishing Partner	127.50
Trimbase	71.50
VIP Professional	183.00
Super Base Professional	79.50

AMIGA

GAMES	ONLY
Earl Weaver Baseball	18.50
Terrorpods	18.50
Marble Madness	22.50
Arctic Fox	15.00
Goldrunner	18.50
Archon + One on One	15.00
Chessmaster 2000	18.50
Skyfox	11.50
Swooper	15.00
Stargider	18.50
Demolition	7.50
Cruncher Factory	7.50
Challenger	7.50
Phalanx	7.50
Barbarian	18.50
Super Huey	15.00
Karate Kid II	18.50
basketball	18.50
Hollywood Poker	15.00
Archon II	22.50
Flight Simulator 2	45.00
Silent Service	18.50
Baseball	18.50
World Games	18.50
Winter Games	18.50
Shanghai	18.50
Leaderboard	18.50

ADVENTURE & STRATEGY	ONLY
Bards Tale	18.50
Faery Tale	37.50
King of Chicago	22.50
Sinbad	22.50
Seven Cities of Gold	11.50
Defender of the Crown	22.50
Kings Quest III	22.50
Deja Vu	22.50
Balance of Power	22.50
Hoolywood Hi-Jinx	22.50
Stationfall	22.50
Hitchiker's Guide	22.50
Borrowed Time	18.50
SDI	22.50
The Pawn	18.50
Guild of Thieves	18.50
Beaurocracy	22.50

ART & MUSIC	ONLY
Instant Music	18.50
Aegis Draw Plus	239.00
Aegis Animator + Images	96.00
Aegis Sonix	64.00
Deluxe Paint 2	52.50
Deluxe Print	18.50
Deluxe Music Con. Set	52.50
Deluxe Video	89.00
Pagesetter	119.00
Laserscript	36.00

LANGUAGES	ONLY
MCC Pascal	71.00
Lattice C	127.00
Cambridge Lisp	119.00
MCC Toolkit	31.00
MCC Assembler	52.50
MCC Shell	39.00
Modula 2 Standard	79.00
Modula 2 Developers	119.00
K_Seka	64.00
Absoft A/C Fortran	236.00
Absoft A/C Basic	156.00

UTILITIES	ONLY
MiAmiga Ledger	79.00
Scribble 2	79.00
Pagesetter	119.00
Laserscript	36.00
PCLO Junior	184.00
Goldspell	36.00
SuperBase Personal	79.00

BEST PRICES *FASTEST* DELIVERY!

Lots of Public Domain Software from only .... £3.50 per disk!

ALL PRICES INCLUDE VAT AND FIRST CLASS POST
TELEPHONE (0636) 79097 FOR PERSONAL ASSISTANCE
Send Cheque/PO to:

BYTEBACK Dept. YC 6 Mumby Close Newark. Notts. NG24 1JE

READERS OFFERS (November)

To order special offers or a subscription to *Your Computer* simply tick the item(s) you require from the list below and fill in the coupon details. Please allow 28 days for delivery.

NAME: ______________________

ADDRESS: ______________________

____

____

POSTCODE: ______________________

ITEM	PRICE	No. Required	ITEM TOTAL
Dust cover set			
PC 1512/1640	£11.95	☐	£____
PCW8256/8512	£ 9.95	☐	£____
Introduction to			
IBM PC/XT/AT & Compatibles	£31.44	☐	£____
Locoscript	£31.44	☐	£____
The PCW Computer	£31.44	☐	£____
The Amstrad PC 1512	£31.44	☐	£____
Desktop Publishing	£31.44	☐	£____
Portex Personal Organiser			
With Binder	£89.00	☐	£____
Extra Paper	£89.00	☐	£____
(Floppy Discs)			
Pack of 5	£14.00	☐	£____
10	£28.00	☐	£____
Library Case	£5.95	☐	£____
With 5 discs	£19.00	☐	£____
With 10 discs	£33.00	☐	£____
Postage	£1.00	☐	£____
Overseas	£2.00	☐	£____
Subscription (Binders)			
U.K.	£15.00	☐	£____
Overseas	£30.00	☐	£____
		TOTAL ORDER	

PAYMENT IS BY (Please tick) £ ____________

Cheque ☐ Postal order ☐ Access ☐ Visa ☐

Make Payable to **FOCUS MAGAZINES Ltd.**

My Credit Card Number is:

____

Expiry Date ____________

Send this form together with your payment to:
SPECIAL OFFERS, YOUR COMPUTER
GREENCOAT HOUSE, FRANCIS STREET, LONDON SW1P 1DG

BOOT TRACK

Changes to be made in print

Of interest for all benchmark fanatics everywhere is the welcome news that nine of the most prominent European printer manufacturers have ditched the traditional but controversial cps (characters per second) printer performance measurement unit.

Leaping into the gap comes pph, or pages per hour. The newly-formed *European Printer Performance Test Group* (EPPT) is advocating this specification because of growing dissatisfaction with cps. The cabal feels that cps does not take into account factors such as paper movement and printhead direction changes, so making it difficult to compare printers with any accuracy.

The EPPT specification of pph is based on a test simulating a typical user application of a specified letter and spreadsheet printed in accordance with certain parameters. The test is designed to suit all printer types and capacities and takes into account factors such as environmental conditions, test sequence and result presentation. Both draft and best printer quality modes are tested.

The companies presently putting their name to the EPPT are Facit, Hermes, Honeywell Bull, Newbury Data Recording Ltd, Nixdorf, Olivetti, Philips, Siemens and Wenger. Spokesperson for the group, Steve Hodgson of Newbury Data, expressed his hope that this new standard would receive widespread acceptance from the computer press and other printer companies around the world.

The miracle of Pascal

Mira Software has finally come up with a Pascal compiler for the 48K ZX Spectrum. It will produce machine code which runs independently of the compiler, thus allowing it to run rather faster than Basic programs.

The product comes on tape with a version which can be transferred to microdrive. It can also load and save programs on microdrive. A full implementation of the BS 6192 standard, the Pascal compiler costs £15.

Internal Pascal files are stored on microdrive and external files are matched with the input and output streams of the Spectrum. With about 16K of memory being taken up by the compiler, including the editor and run-time routines, there is still a good amount of space left over for Pascal programs.

The package is completed by a manual and three demonstration programs, one a spelling checker for word processor text files.

For any information, Mira Software can be contacted at 24 Home Close, Kibworth, Leicestershire LE8 0JT.

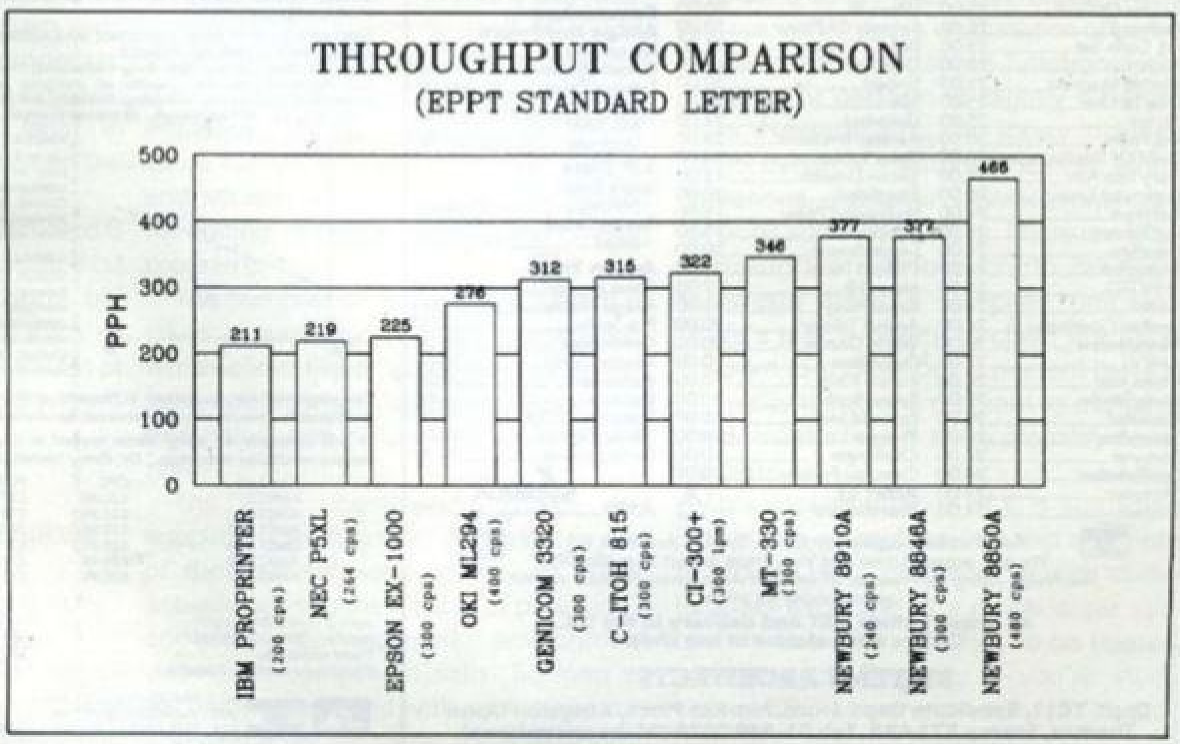
C – The Video

It is now possible to rent from Real Time Systems its C programming language training course, known as *C Video*. Students are able to work their way through the six self-contained video modules at their own pace. Real Time claims that this instruction course should make the student able to write well-structured, efficient programs in standard C.

A textbook accompany the video modules is called "Learning to Program in C". It is the fruit of lengthy research by Thomas Plum. Also included are a C Video workbook and a diskette with source code for the example programs and workshops. Telephone support can be given to users who require further assistance, although familiarity with a high level language will be necessary in this case.

It would be difficult to call the price charged for C Video low. At £1,200 it is more expensive than a flight around the world and probably not quite so much fun. Renting the course is rather more economical at a rate of £198 for two weeks. The workbook is included in the rental price and extra copies can be ordered. The C Video is available in PAL/VHS format while the source code of example programs is on a 5.25in. PD/MS-DOS format diskette.

For further information, telephone 0624 26021.



The Best Software from HiSoft

Atari ST

HiSoft DevpacST assembler development system	£49.95
HiSoft Saved! invaluable desk accessory	£29.95
HiSoft BASIC super-fast and standard compiler	£79.95
FTL Modula-2 interactive compiler, fast & standard	£69.95
With CP/M Emulator	
Nevada COBOL excellent learning package	£39.95
HiSoft Devpac80 Z80 assembler development	£39.95

Amstrad PCW

FTL Modula-2 interactive compiler/editor	£54.95
FTL Editor Toolkit complete source code	£39.95
FTL Editor Toolkit when bought with compiler	£34.95
HiSoft Pascal80 fast, interactive, GSX graphics	£39.95
HiSoft Devpac80 version 2 full Z80 development	£39.95
HiSoft C integer K&R with GSX graphics	£39.95
Knife Plus full disc recovery and editing	£19.95
Nevada COBOL ideal for learning	£39.95
Nevada FORTRAN close to ANSI-66, easy-to-use	£39.95
HiSoft LISP interpreter with lots of functions	£39.95

New Products

New products this month include HiSoft LISP for the Amstrad CP/M machines, HiSoft Projector & Creator for PCs, FTL Modula-2 for the Atari ST and Spectrum Plus 3 disc versions of HiSoft software. Send for full details.

Amstrad CPC

HiSoft Pascal80 fast, interactive with firmware lib	£39.95
HiSoft Devpac80 standard Z80 development	£39.95
HiSoft C integer K&R compiler tape/disc	£19.95/£39.95
Nevada COBOL ideal for learning	£39.95
Nevada FORTRAN close to ANSI-66, easy-to-use	£39.95
HiSoft TurboBASIC integer CPC BASIC compiler	£9.95
HiSoft LISP interpreter with lots of functions	£39.95

PC & Compatibles

FTL Modula-2 small memory compiler	£54.95
FTL Modula-2 large memory with 8087 support	£69.95
FTL Editor Toolkit full source code	£39.95
Knife86 disc sector editor plus many utilities	£29.95
Utah FORTRAN, PILOT, PASCAL each	£19.95
Utah COBOL good for learning COBOL	£39.95
HiSoft Projector easy-to-use project analysis	£49.95
HiSoft Creator multi-window programmers' editor	£29.95

ZX Spectrum

HiSoft BASIC full floating point compiler	£24.95
HiSoft Devpac the standard Z80 assembler	£15.95
HiSoft Pascal full compiler with Turtle Graphics	£25.00
HiSoft C integer K&R compiler	£25.00

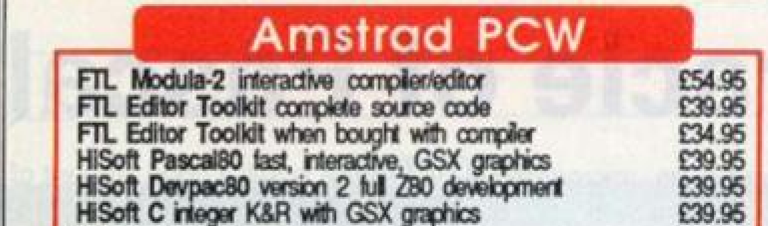
Amiga

HiSoft Devpac complete assembler/debugger	£59.95

All prices include VAT and postage within the UK. You can order by telephone using Access or Visa or send a cheque or postal order to the address below. We despatch by first class post and delivery is usually within 5 working days. Please write or phone for a full catalogue, trade details, export information etc.

HiSoft
High Quality Software

The Old School, Greenfield, Bedford, MK45 5DE.
Tel: (0525) 718181. Credit Card Hotline: (0525) 718271



COMMERCIAL AND COMPUTER SERVICES LIMITED 01 549 3028

Amiga Titles

Bureaucracy	29.00
Golf	29.00
Hacker	20.00
Portal	24.00
Shanghai	20.00
Tass Times	20.00
Witness	25.00
7 Cities Of God	25.00
Archon 2	25.00
Ad. Cons. Set	25.00
Arctic Fox	25.00
Marble Madness	25.00
One To One	25.00
Skyfox	25.00
The Pawn	20.00
Guild Of Thieves	20.00
Fairy Tale Adv.	39.00
Borrowed Time	20.00
Ballyhoo	24.00
Cut Throats	24.00
Deadline	24.00
Enchanter	24.00
THHGTG	24.00
Infidel	24.00
Leather Goddesses	24.00
Mindshadow	20.00
AMFV	27.00
Moon Mist	24.00
Music Studio	29.00
Planetfall	24.00
Seastalker	24.00
Sorcerer	24.00
Spellbreaker	24.00
Starcross	24.00
Suspect	24.00
Suspended	24.00
Trinity	27.00
Witness	24.00
Wishbringer	24.00
Zork I	24.00
Zork II	24.00
Zork III	24.00
Silent Service	20.00
Ultima III	20.00
Balance Of Power	30.00
Def. Of Crown	35.00
Deja Vu	24.00
Sinbad	30.00
SDI	24.00
Uninvited	24.00
Aerena/Brattacus	25.00
Deep Space	24.00
Silicon Dreams	15.00
Starglider	20.00
Hollywood Poker	15.00
Swooper	15.00
Leaderboard	20.00
L'board Tourn.	20.00
Mean 18	24.00
Super Huey	15.00
Apshai Trilogy	20.00
World Games	20.00
Demolition	10.00
Karate King	10.00
Space Battle	10.00
Emerald Mines	10.00
Phalanx	10.00
Challenger	10.00
Cruncher Factory	10.00

Atari ST Hardware

520 STFM	285.00
520 STFM 1 Col.	P.O.A.
1040 STF	P.O.A.
1040 STF + Mono	P.O.A.
Hard Disk (SH204)	P.O.A.
Mono Monitor	P.O.A.
Triangle 1 Mb external drive	133.00

Commodore Amiga Hardware

Amiga 500	499.00
Colour Monitor	399.00
External Drive	249.00
Amiga 2000	1150.00
1 Mb RAM Upgrade	107.00

3.5" Discs

Single Sided (White)	99p each
Double Sided (Blue)	145p each

Amiga Titles

Chess Master	35.00
Amiga Karate	17.00
Pro-Sprite	33.00
Goldrunner	20.00
Karate Kid II	20.00
Barbarian	20.00
Extensor	17.00
Road War 2,000	20.00
Winter Games	20.00
Perfect Sound	70.00

AMIGA A500 499

Please make cheques payable to: Systems Architects Ltd. We also accept Access and Visa. Prices subject to availability.
See Amiga Listing for Prices of ST Infocom Adventures. Products not listed please phone for prices.

All prices include VAT and delivery in the UK.
Callers are welcome at our shop

SYSTEMS ARCHITECTS

Dept. YC11, Syndicate Dept. Store, Market Place, Kingston Upon Thames, Surrey KT1 4BR. Tel: 01-549 3028 (24-hr ansaphone)

AMSTAT & STATMODE

MODULAR STATISTICS AND MATHEMATICS PACKAGES

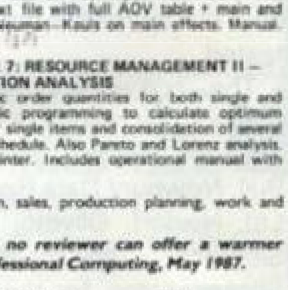
MARKETED BY

S. C. COLEMAN LIMITED

AMSTAT for PCW & CPC **STATMODE for PC Compatibles**

AMSTAT 1/STATMODE 1 – means, st. devs., variance, skew, kurtosis, 1–sample, 2–sample, and paired t–tests, 1–way–AOV with single and mult. conf. intervals, 2–way–AOV, correlns, regression, histograms, scattergrams, transformations, file store and retrieve, output to WP file, manual, Flexible variables and observations to a total of 500 (+) data points (12000 STATMODE).

AMSTAT 2/STATMODE 2 – 27 nonparametric tests providing a "complete Siegel", Binomial, Chisquare(3), Kolmogorov–Smirnov(2), Runs, McNemar, Sign, Wilcoxon, Walsh, Randomisation(2), Fisher, Median (+extension), Mann–Whitney, Wald–Wolfowitz, Moses, Cochran, Friedman, Kruskal–Wallis, Contingency, Spearman, Kendall, Kendall partial, Concordance.



AMSTAT 3/STATMODE 3: FORECASTING
An array of business oriented mathematical and statistical software: Linear and Polynomial regression, Trend and Seasonal Variation, Multiple Regression Analysis, Transformations, Exponential Smoothing, Adaptive Filtering, Graphic display, full printout, manual suited to immediate use and for teaching. (Additional program for PC).

AMSTAT 4/ STATMODE 4: RESOURCE MANAGEMENT – LINEAR PROGRAMMING MODULE
General Purpose Linear programming • Specialised Transportation and assignment variants. Capable of analysing and solving problems of sequencing, scheduling, blending and allocation of scarce resources. 40 Page manual, 18 worked examples.



AMSTAT 6/STATMODE 6: SFANOVA
Up to 8—way analysis of variance for equal cell sizes. Unequal cell sizes on 1—way AOV. Maximum of 2000 data points (300 on unexpanded CP/M 2.2, 4000 on PC). Input from ASCII Files. Output to screen or text file with full AOV table + main and interaction means and Newman–Keuls on main effects. Manual. (Disc only).

AMSTAT 7/STATMODE 7: RESOURCE MANAGEMENT II – STOCK AND PRODUCTION ANALYSIS
Calculation of economic order quantities for both single and multiple items. Dynamic programming to calculate optimum production schedules for single items and consolidation of several results into a multiple schedule. Also Pareto and Lorenz analysis. Output to screen or printer. Includes operational manual with worked examples.

The programs have applications in research of all kinds, education, sales, production planning, work and method study, financial planning, personnel, social work etc.

"I will certainly be using them myself in the future and no reviewer can offer a warmer recommendation than that." Dr. Peter Morris, Amstrad Professional Computing, May 1987.

Price List	CPC	PCW	PC	
AMSTAT1	£25.95	£27.95	STATMODE1	£29.95
AMSTAT2	£39.95	£39.95	STATMODE2	£39.95
AMSTAT3	£25.95	£27.95	STATMODE3	£39.95
AMSTAT4	£25.95	£27.95	STATMODE4	£29.95
AMSTAT6	£25.95	£27.95	STATMODE6	£29.95
AMSTAT7	£25.95	£27.95	STATMODE7	£29.95

ANY 2 – 15% DISCOUNT
ANY 4 – 20% DISCOUNT
Please enquire for Educational quantity discounts.

ALL PRICES INCLUDE POST AND PACKAGING IN THE U.K. BUT EXCLUDE VAT.

CHEQUES AND P.O.s TO:

S. C. COLEMAN LTD.
33 LEICESTER ROAD, ASHBY-DE-LA-ZOUCH
LEICESTERSHIRE, LE6 5DA
TEL: 0530 415919
24 Hour Answerphone. Technical enquiries after 6.00pm

Seeing eye to eye

ADAM DENNING LOOKS AT THE WAY IN WHICH THE ACORNSOFT C COMPILER WORKS AND CONCLUDES THAT IT IS DIFFICULT TO B EAT.

In many programmers' eyes the BBC Micro could never be taken seriously as a development machine until it supported a C compiler. The limitations of the 6502 processor inside the machine have made it impossible to implement a useful or effective true compiler (the main problem being the fixed stack of the 6502) for almost any block-structured language.

This is why Acornsoft C compiles to a psuedo-code which is interpreted at run-time. It is an action familiar to users of any other major BBC language, including BCPL and Pascal. At present, there appears to be no scope for generating stand-alone programs, so one would require the Acornsoft C system in order for any compiled programs to be run. As it seems unlikely that the compiler would be used for the generation of commercial programs anyway, this isn't much of a problem.

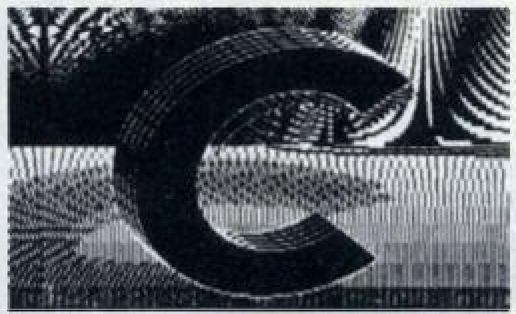
The software is supplied on both DFS 80-track 5.25in. disk and ADFS 80-track 3.5in. disk, making it compatible with most systems. However, you require a 6502 second processor or sideways RAM for the system to run on a standard BBC Micro. These items have been perquisites for program development for some time now, so it is fairly likely that a potential purchaser of Acornsoft C will have the required hardware.

Acornsoft C is modelled on the language described in the seminal book 'The C Programming Language' by Brian Kernighan and Dennis Ritchie, with library extensions and so forth consistent with the X/OPEN standards group proposals. My experience is that the emerging ANSI standard is predominant, at least in America, but the difference between the two is not clear.

Acornsoft C supports all the standard C data types but in common with other 8-bit implementations does not include bit-fields or new-keyword support, such as **enum** for enumerated types. The sizes of the standard types are shown below:

char	0..255
int	−32768..32767
short	as int
long	−2147483648..2147483647
unsigned	0..65535
float	−1e38..1e38 approximately
double	as float

The array, structure and union aggregate types are fully supported and the ability for the user to define types using **typedef** is fully implemented. The compiler does not produce code supporting register variables, presumably because any registers in an interpretive code are pseudo-registers anyway, so any optimisation which would be lent by the user is removed. An interesting machine-specific is mentioned in the manual – the '\n' constant is 0x0a in Unix and on almost all other implementations of C; in Acornsoft C it is 0x0d.



Useful extensions to the language which are supported by Acornsoft C include the **void** data type and the use of identical member names in different structures. In some very old implementations of the language, two structures could not hold a member with the same name unless that member is of the same type and offset in both structures. This has long been regarded as a silly feature of C and has been removed in almost all modern implementations. Acornsoft C also allows the programmer to switch on a floating-point variable by truncating the value of the variable at switch-time. Personally I think that this is a very bad idea.

Acornsoft C presents itself as a new environment on the BBC Micro, similar to the Logo, Pascal and BCPL language implementations offered by Acornsoft. Once loaded, it produces its own prompt and accepts a limited set of commands for editing, compiling, linking and running programs.

The compilation command, COMPILE, takes a number of optional parameters which allow the programmer to perform such operations as command-line macro expansion and automatic linker-invocation.

The EDIT command invokes the supplied screen editor. Acornsoft is one of the few software companies which actually goes to the trouble of providing a complete development environment with each compiler it sells. So long as each editor supplied with each system is approximately the same, it is a wonderful idea. Other software companies should take note of it. Screen editors are easily the most personal of utilities and every programmer has his or her preferences.

If standard text is produced, any editor may be used but Acornsoft recommends that the supplied one is used because it is written specifically for programming in C. This point intrigued me, as most professional programmers become very annoyed with 'syntax-directed' editors: editors which attempt to anticipate your typing by inserting keywords as you type. The problem is they always seem to do it in just the wrong places.

It was encouraging to discover that apart from a few regular expression search commands and a limited macro facility, this editor does not attempt to write your programs for you. I would say that it is no more C language-specific than any other programmers' editor, but that does not reduce its usefulness.

The editor provides the usual block operations, full cursor control, file reads and writes, pattern-matching search and replace (using regular expressions very similar to those supported by the standard Unix utility **grep**) and so forth. Whether the programmer chooses to use it or not, this editor is a welcome part of the package.

The library supplied with Acornsoft C attempts to be as close as possible to the X/OPEN recommendation. Naturally enough, the fact that the system is running on a single-user 6502-based micro system rather than a workstation of some variety means that some functions cannot exist or perform in slightly different ways. Nevertheless, the library includes file i/o, dynamic memory allocation, string operations, character classifications, conversions and system calls. There is a facility, using the **call** function, to call 6502 assembler from a compiled program. There's also a facility to chain from one program to another but at present there is no facility to run one program as a child of another (let's face it, there probably never will be!).

This implementation of C is surprising in that it is so professional and attempts to provide the C programmer with all the facilities expected of a much larger system. In this attempt it has to be treated with respect. Basically, if you're stuck with a BBC Micro and you want to program in C, buy this compiler.

Debugging

dongle [*dong1*] *n,v* device attached to a computer in order to prevent unauthorised use of software, etc. *It wouldn't print anything because the dongle was unconnected. We'll dongle the programme, that will sort them out* **dongling, de-dongle** [Scand., from dange, to hang loosely, to keep someone waiting for an answer]

Dongles can be much more fun than any adventure game. Any hacker worthy of the name will relish the sheer challenge of spending hours sweating over a hot computer, unassembling acres of code, searching for the tiniest clue, pitting a lone brain against an anonymous hierarchy. There's a story going around that the Dutch head office of a certain company has employed a young programmer for a year for the express purpose of de-dongling the software package which is the mainstay of their business. These things go on, even though you may not hear of them very often.

Such activities are of course highly disreputable and should be tut-tutted as loudly as possible.

Many people, however, don't even know what a dongle is and this definition is perhaps the first formal one ever to appear in print. A dongled programme contains code which interrogates the dongle and limits operation in the absence of a correct response.

If you would like to be the first on your block to rise to the dizzy heights of actually beating one, you're going to have to get to grips with Debug, the MS-DOS software utility which enables you to examine disk files, browse around memory, trace through programs and do all sorts of other wonderful things, all of which are entirely wholesome, healthy (mostly) and stop you from spending too much money on beer. So read on.

Last month I dealt with some of the fundamental concepts of Debug and so we kick off this time with something only slightly more complicated, the interrupt. Lots of hints for hackers here.

What exactly is an interrupt? Think of an ordinary, mundane interruption such as might occur in any one of a million homes just after tea and in the middle of Coronation Street. It begins with a signal ("Dad!"), then comes an exchange of information ("Mum says can you clean up the mess the dog's made in the kitchen"), a diversion (you were just about to fall asleep in front of the Rovers Return) and then (hopefully) a return to your previous happy state. Believe it or not, this is exactly what happens in a computer, except that it's fairly unlikely that the computer has heard of Ena Sharples.

Interrupts come in many shapes and sizes and can be invoked by hardware or software. For example, if a computer keeps track of the time, the clock 'tick' is simply a timer chip providing a regular hardware interrupt and a piece of code which updates the clock. What actually happens is that a signal is placed on an INTR pin of the MPU, it then stops what it is doing and acknowledges with INTA, the Programmable Interrupt Controller (PIC) places address information on to the bus and the MPU then takes the information and jumps to that address. The address information is called an Interrupt Vector and the code which the MPU executes in response to the interrupt is called the Interrupt Service Routine (ISR).

The best thing about interrupts is that you always know how to find them: just have a look around at the very bottom of memory with the Debug command D0:0 to see the interrupt vectors. They appear as four bytes in what must surely be a pinnacle in the language of computerese:

23 06 AC 55

In Intel's topsy-turvy format this really means 55ac:0623. Unassemble from this address and you're looking at the ISR.

If this vector were located at 0:84h I could get to show off my considerable mathematical skills and demonstrate that 84h = 21h × 4 and so is the location of the vector for MS-DOS interrupt 21h. This is the general purpose software interrupt used for putting characters on the screen, taking codes from the keyboard and other things of similar earth-shattering importance to a computer. Determining the nature of the interrupt in a particular piece of code will often be the best clue you'll get to what that code is doing.

Examining such things as the ISR for interrupt 21h plunges you deep into the innards of the machine itself. Playing around with the operating system and Bios is real fun: it's like a game of Russian Roulette and if the machine crashes you lose. Assembling code into a live operating system is what I call real hacking.

Of course there's nothing to stop you using Debug to unassemble a disk file or section of memory at random, except that you have to be able to tell if you are actually looking at code, not data or random remnants left lying around. At any time, attempting to unassemble from an address which is not the start of an instruction will produce gibberish but





Debug very cleverly 'locks on' to code after disassembling twenty bytes or so.

Interrupts can also be located simply by tracing them; tracing the INT 3 instruction changes CS and IP to show both the segment in which Debug itself is loaded and the address of the interrupt.

Most of the time however we would prefer to avoid interrupts. You're lazily tracing through a programme and an instant later you don't know where you are, you're lost in a sea of Bios. Suddenly MS-DOS doesn't seem so wonderful after all. A trace step shows the current registers and the *next* instruction to be executed, rather than the one just gone, so we can jump over any interrupt we see coming by adding 2h to the Instruction Pointer with the RIP command. Alternatively we can neutralise the interrupt altogether with a command such as

Eaddress 90 90

90 is the opcode for NOP, no operation.

This is where we begin to show a bit of cunning. Readers from last month will know that my own favourite computer is the Victor Sirius. This comes with an emulator which enables CP/M 86 programmes to run under MS-DOS. So let's say we want to Debug a CP/M 86 programme which loads sections of code from disk as and when required. Put another way, we want to hack a CP/M programme which uses overlays and Debug the lot under MS-DOS. Sounds difficult?

The alternative is to use the CP/M equivalent of Debug: DDT – Dynamic Debugging Tool. It's got even more bugs in it than Debug, it uses an entirely different set of commands and worst of all you have to boot up CP/M to run it. Fortunately this truamatic experience can be avoided; we simply use the Debug Name facility.

Suppose further that our programme is called OLDHAT.CMD and it's already been established (say, by selectively deleting files and then searching for clues) that the code we want to trace is in OVERLAY.004 at 1dd4h. It's not possible to set a breakpoint because we don't know where OLDHAT is going to load the overlay file in memory; consequently it's not possible to specify a breakpoint address.

A breakpoint does exactly what you'd think; suspends operation of a programme when a specified breakpoint address is reached. It's set and executed with the Go command. Debug achieves this by inserting an interrupt type 3 (opcode CC) at the designated address. When this interrupt is encountered, control returns to Debug which automatically swaps the INT 3 instruction for the original byte and enters single-step mode. All we have to do is make a note of the original byte at 1dd4h in the overlay file, replace it with CC to force the breakpoint, write it back to disk so that it's ready for the next time it's loaded and

A>debug cpm.exe
Noldhat
G

Using the Name function in this way is equivalent to entering CP/M OLDHAT at the prompt, the normal way to run a CP/M programme under the emulator. Execution of the programme continues until CC (= INY 3) is encountered in the overlay file whereupon control jumps back to Debug and the original byte is restored manually before tracing. This very powerful technique can be used for any programme which uses overlays.

It is always feasible that all or part of Debug could be overwritten by the programme being debugged. Problems like this give rise to the truism that debuggers should be as small as possible and preferably in ROM. Faced with this difficulty, the first thing to try is the Iteration Game – running Debug under Debug. For example:

A>debug debug.com
G
Nsomefile.exe
L

or similarly using Debug to tuck a second Debug into an out of the way segment and controlling execution of the troublesome programme using that. The Iteration Game can be continued *ad absurdum* – or at least until you run out of memory.

A more dastardly trick which a software developer might use to foil would-be hackers is to use interrupt 3, the interrupt traditionally reserved for debugging, in his own program. In this case the determined hacker hoists the skull and crossbones and bounces back with interrupt 1 (opcode CD 01) firmly clenched between the teeth. Interrupt 1 is a direct instruction to the 8088 to enter single step mode. It can be inserted into any programme or overlay in the same way as our previous example, but now we must subtract 2h from the Instruction Pointer and restore two bytes manually before any subsequent tracing.

Debug is at its best with .COM files, i.e. binary image files of less than 64K which are loaded into the nearest convenient segment at an offset of 100h. EXE files, on the other hand, are rather less specific and contain a header and relocation table. Debug cannot write such files to disk; an EXE file or any file greater than 64K can only be permanently modified by writing absolute sectors. This is quite an advanced and dangerous operation because it bypasses the operating system.

Let's say that a single sector on the disk is 512 bytes long. The maximum number of sectors which can be loaded into the 64K (less 100h) Debug segment is 127 or 7f hex. The command

Lds:100 1 0 7f

loads 7fh sectors starting at sector 0 from drive 1 (B:) into the data segment at 100h. Searching for the appropriate sector on the disk will be made easier if the file to be examined is copied onto a freshly formatted disk and memory is cleared prior to loading with the command

F100 fffe 00

All programmes begin life as EXE files and for those which can be converted to COM format (specifically, those object files which generate the **No STACK Segment** error from the linker, which is ignored) there is an undocumented feature of Debug. The sequence

A>debug somefile.exe
Nsomefile.com
W

strips off the header etc. to produce a COM file directly.

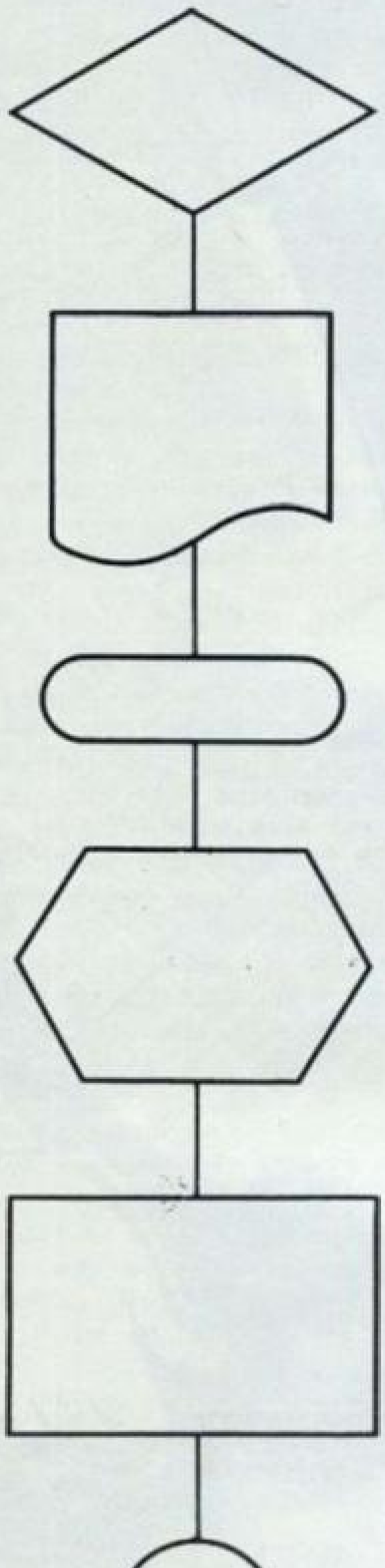
This is equivalent to the EXE2BIN utility. Another undocumented feature, mentioned briefly last month, is the P command introduced in DOS 3 Debugs. This command appears to be very similar to the Trace command but allows interrupts to be actually executed while tracing, although using the P command as a general replacement for Trace will hang the machine after a while. With undocumented features like this, your guess is as good as mine – does anyone know what P stands for? First correct entry out of the hat gets a free copy of last week's Beano.

Comparing files of up to 64K with Debug is easily achieved by loading the second file into any free memory segment, but comparing files greater than 64K is only possible by splitting the files into smaller sections using absolute disk reads as above. Attempting to exceed the 64K segment available to Debug is likely to result in the data 'folding back' to the bottom of the segment, with the effect that the first 100h which Debug reserves for itself will be overwritten.

So that's it for our lightning tour of Debug. If you've followed this far, laughed at the jokes and wept over absolute disk reads, you're well on the way to cracking that mystical dongle and reaching the hacking equivalent of Nirvana. But never, never proclaim yourself to be an expert – there are enough people doing that already.


RIP

ADVENTURE BUILDING



AFTER ONE OR TWO EDUCATIONAL DIGRESSIONS, PETER GERRARD VENTURES SOME ADVICE ON THE DIFFICULTIES INVOLVED WITH WRITING VERBS.

You know me, ever one for the quiet life, so a severe lambasting by all and sundry in and about the September issue of *Your Computer* quite disturbed the old equilibrium. Before we get on to seeing how to program verbs into adventures, let me take this brief opportunity to construct my defence.

The letters page featured a snipette from D. Snocken of Southampton concerning the article on text compression. The method he outlines is all very well, and indeed I used something similar in an adventure called *The Odyssey* once, written by myself and someone I'll be coming to in a moment, but I found that either little memory was saved or that a whole collection of room descriptions were generated which came across as fairly similar. It was okay for short descriptions but not so hot on long ones, since there are only so many numbers and letters (his method) which can be used to store phrases. Once beyond the number 9, more time is spent decoding the numbers than printing the descriptions.

Using tokens is better, which brings us to ASCII. I approve of portability, I applaud the concept of ASCII and I just wish that every computer really did use the standard instead of plumping for its own interpretation of it. No two delete keys seem to be the same, for example.

Another grumble comes from my co-author on *The Odyssey*, my brother Mike. He is having a go at me for urging people to write their own adventures rather than using a utility. Well, if you want to write a shaggy dog story using *PAW* or scratch out an adventure using *The Quill* then that's fine by me, but if you have a (dare I say it?) up-market computer which doesn't have one of these fine utilities available for it, what do you do? Take out a subscription to *Your Computer* and buy all the back issues up to April, that's what. So, each to their own, and hopefully we won't turn this into a vast, never-ending debate.

On with the programming!

With the code encountered so far, our line 77 tells us **77 GOTO vb*50+2000.** This is fine on machines with a computed GOTO command; others will have to use a stream of ON VB GOTO instructions. Whatever method is used, we eventually arrive at line 2050 if the variable vb contains the value 1, line 2100 if it contains the value 2, and so on. Assuming that the first verb is 'open' and the second one is 'close', that is vb$(1)="open" and vb$(2)="close" (or vb$(2)="clos" depending on how many letters you're checking for), here's how we might go about incorporating them.

First of all, some ground rules. In this adventure there are five doors which can be opened: an ordinary one in location 5, another ordinary one in location 48, and three rather special ones in locations 52, 53 and 54. Special because they are of different colburs (yellow, green and blue) and each door requires a key of the correct colour in order to open it. The first two doors can be opened and shut at will, since they don't have locks on them. What, then, is the point of having them? Well, this adventure features a number of characters other then your good self, not all of whom are blesseu with the intelligence to open a door at first sight. One of them in particular is more likely to blast it with his gun than he is to try and open it, so it gives you a little bit of leeway on the old time front if you get through first and then close the door behind you.

Special

The three special ones are in a hotel (the others are simply the door to a stable and the door to a saloon), and getting the right key to fit the right door is a tricky enough problem in itself. Playing the game properly should see you opening them in the correct order as well; all part of the problem of solving this particular adventure.

But (of course) doors aren't the only things in the world which can be opened. Two boxes are featured in the game. Ini-

tially, one is to be found inside the other, which then leads to all kinds of complications. In order to perform a specific task, the correct object must be in the correct box, and various things can, if they are of a suitable size, be stored in one or other of them. Thus verbs like 'put' (for putting an object in a box) and 'remove' (for taking it out again) have to be considered as well as the more ordinary open and close. We'll cover these problems when we get to them.

Secondly, as well as being aware of our variables, vb, liu, ac and no (for verb number, link word number, action word number and noun number), you'll need to know the following things. The variable holding the current location of the player is cp, and as we've seen there are doors in locations 5, 48, 52, 53 and 54. Boxes can, of course, be opened and closed anywhere. The first noun is 'box', the second, 'door'. The first and second objects are a large box and a small box, with the link word 'smaller' being used to distinguish between the two. This is the first link word.

Other link words are 'yellow', 'green' and 'blue' for the three coloured doors, and these are numbered 'three', 'four' and 'five' respectively, with objects three, four and five being the keys of the appropriate colour.

Numbers

Where do all these number come from, though? All arbitrary, and since these are the first two verbs (other than saving and restoring progress) we are going to consider in any great detail it is sheer coincidence which sees all these numbers as relatively small ones. Later verbs have suitably higher numbers. Your own adventures will understandably feature different numbers in different situations, so there is nothing magical about having the blue key as the fifth object, it just happened that way.

The final point to consider is that the code here is NOT the code from the finished adventure. Not because it doesn't work (it does, honest) but because that finished code would be almost unintelligible to the person seeing it for the first time. For example, the phrase "You can't do that" is featured quite a few times; the finished game sees this replaced with a string variable in order to save memory. Other phrases have also been replaced by strings in the final version of the game, but in order to make things a little bit more sensible I padded everything out a bit. Some of the code has been expanded a little as well, making it (hopefully) easier to follow. You would, needless to say, compact things

```
2050 REM open
2052 IF no=1 THEN 2070
2053 IF cp<>5 AND cp<>48 AND cp<>52 AND cp<>5
3 AND cp<>54 THEN PRINT"There's nothing to op
en here.":GOTO 10
2054 IF no<>2 THEN PRINT"You can't do that.":
GOTO 10
2055 IF cp=5 AND d1=1 THEN PRINT"You've alrea
dy done that.":GOTO 10
2056 IF cp=5 THEN d1=1:GOTO 2069
2057 IF cp=48 AND d2=1 THEN PRINT"You've alre
ady done that.":GOTO 10
2058 IF cp=48 THEN d2=1:GOTO 2069
2059 IF li=0 THEN 2061
2060 IF (cp=52 AND li<>3) OR (cp=53 AND li<>4
) OR (cp=54 AND li<>5) THEN PRINT"That's the
wrong door!":GOTO 10
2061 IF (cp=52 AND d3=1) OR (cp=53 AND d4=1)
OR (cp=54 AND d5=1) THEN PRINT "You've alread
y opened it.":GOTO 10
2062 IF (cp=52 AND ob%(3)<>-1) OR (cp=53 AND
ob%(4)<>-1) OR (cp=54 AND ob%(5)<>-1) THEN PR
INT"You haven't got the right key.":GOTO 10
2063 IF cp=52 THEN d3=1:GOTO 2068
2064 IF cp=53 THEN d4=1:GOTO 2068
2065 IF cp=54 THEN d5=1:GOTO 2068
2066 PRINT"How did you get here?!":GOTO 10
2068 PRINT"You unlock and open the door.":GOT
O 10
2069 PRINT"You open the door.":GOTO 10
2070 IF li=1 AND (ob%(2)=-1 OR ob%(2)=-2) THE
N 2081
2072 IF li=1 THEN PRINT"You haven't got the s
maller box.":GOTO 10
2074 IF ob%(1)<>-1 THEN PRINT "You haven't go
t the box.":GOTO 10
2076 IF o1=1 THEN PRINT "You've already done
that.":GOTO 10
2078 IF bo=1 THEN PRINT "You find a smaller b
ox.":bo=2:o1=1:ob%(2)=-2:GOTO 10
2080 o1=1:bt=-2:GOTO 2085
2081 IF ob%(2)=-2 AND ob%(1)<>-1 THEN 2074
2082 IF o2=1 THEN PRINT"You've already done t
hat.":GOTO 10
2083 IF o1=0 AND ob%(2)=-2 THEN 2146
2084 o2=1:bt=-3
2085 of=0:FOR i=1 TO nn:IF ob%(i)=bt THEN of=
of+1
2086 NEXT i:IF of=0 THEN PRINT"There's nothin
g in the box.":GOTO 10
2088 PRINT"There appears to be something in i
t.":GOTO 10

2100 REM close
2102 IF no=1 THEN 2132
2103 IF cp<>5 AND cp<>48 AND cp<>52 AND cp<>5
3 AND cp<>54 THEN PRINT"There's nothing to cl
ose here.":GOTO 10
2104 IF no<>2 THEN PRINT"You can't do that.":
GOTO 10
2105 IF cp=5 AND d1=0 THEN PRINT "You've alre
ady done that.":GOTO 10
2106 IF cp=5 THEN d1=0:GOTO 2131
2107 IF cp=48 AND d2=0 THEN PRINT"You've alre
ady done that.":GOTO 10
2108 IF cp=48 THEN d2=0:GOTO 2131
2109 IF li=0 THEN 2111
2110 IF (cp=52 AND li<>3) OR (cp=53 AND li<>4
) OR (cp=54 AND li<>5) THEN PRINT"That's the
wrong door!":GOTO 10
2111 IF (cp=52 AND d3=0) OR (cp=53 AND d4=0)
OR (cp=54 AND d5=0) THEN PRINT "You've alread
y closed it.":GOTO 10
2112 IF cp=52 THEN d3=0:GOTO 2130
2113 IF cp=53 THEN d4=0:GOTO 2130
2114 IF cp=54 THEN d5=0:GOTO 2130
2115 PRINT"How did you get here?!":GOTO 10
2130 PRINT"You close the door and hear a lock
 snap into place.":GOTO 10
2131 PRINT "You close the door.":GOTO 10
2132 IF li=1 AND (ob%(2)=-1 OR ob%(2)=-2) THE
N 2142
2134 IF li=1 THEN PRINT"You haven't got the s
maller box.":GOTO 10
2136 IF ob%(1)<>-1 THEN PRINT "You haven't go
t the box.":GOTO 10
2138 IF o1=0 THEN PRINT"You've already done t
hat.":GOTO 10
2140 o1=0:PRINT"You close the box.":GOTO 10
2142 IF o2=0 THEN PRINT"You've already done t
hat.":GOTO 10
2144 IF ob%(2)=-1 THEN PRINT"You close the bo
x.":o2=0:GOTO 10
2146 IF o1=0 THEN PRINT"You can't.  The large
r box is already closed and you can't get at
it.":GOTO 10
2148 o2=0:PRINT"You close the smaller box ins
ide the larger one.":GOTO 10
```

Now! Master Machine Code!

Here's *your chance* to master *machine code* on your:

- **Spectrum!**
- **Commodore 64!**
- **Amstrad!**



And, for the real expert, we have the ultimate trip - ADVANCED Z80 PROGRAMMING!

At very special prices for Your Computer readers!

SPECTRUM/SPECTRUM+

Mastering Machine Code on Your Spectrum - Toni Baker

This acclaimed book is designed to teach the essential elements of programming in machine code on the Spectrum and Spectrum +. It assumes aboslutely no knowledge of the subject whatsoever, and yet still promises rto take you to a level of proficiency beyond your wildest dreams. Starting with simple addition and subtraction, you are slowly guided through printing and inputting in machine code. You are shown how to use the screen to its utmost. The book explores and utilises the incredible speed of machine code, giving your real time graphics games like BREAKOUT. **Special offer price to readers of *Your Computer* - £5.00, plus 55p postage.**

Spectrum Machine Code Made Easy

Volume One - For Beginners

Volume Two - Advanced

Originally published at £5.95 per book, both books are now available as a set, for just £5.00, plus 70p postage.

AMSTRAD!

Now you can get to grips quickly with machine code on your Amstrad! As well as a complete, easy-to-follow course to take you through all the elements of programming in machine code on your Amstrad, this exciting book contains a generous collection of ready-to-run machine code routines (including pixel by pixel scrolling in four directions). You can incorporate these into your BASIC programs, even if you don't have a clue how they work! These 'pre-packaged' machine code routines are designed to make created arcade and animated games as simple as possible. A complete arcade game is also included in the book to show the routines in action.

Chapter headings include

- Your first machine code program
- Passing parameters
- Simple Arithmetic
- Stacking and Jumping
- Logical Operators
- Screen and ROM Routines
- The Games Writing Package

Originally published at £8.95, **MASTERING MACHINE CODE ON YOUR AMSTRAD 464/664/6128** is available as a special offer to readers of Your Computer for just £5.00, plus 55p postage!

Mastering Machine Code on the Commodore 64. Now you can master machine code on your C64. Say goodbye to jerky, slow-moving graphics in BASIC, and learn the secrets of professional, incredibly swift graphic production in machine code!

Mastering the Commodore 64

Both these books were originally published at £7.95 each. As a special offer to readers of Your Computer, they are now being offered as a set, for just £5.00 in all, plus 70p postage!

ADVANCED Z80 MACHINE CODE PROGRAMMING Originally published at £12.95, this 342-page book is now available for £5.95, plus £1.00 postage!

Interface Publications Ltd.,
9 - 11 Kensington High Street,
London W8 5NP

Please send me the following:

[_] Mastering Machine Code Spectrum - £5.00, plus 55p postage

[_] Spectrum Machine Code Made Easy - Volumes 1 and 2 - £5.00, plus 70p postage

[_] Mastering MC Amstrad - £5 plus 55p

[_] Mastering MC Commodore 64/Mastering the C64 - £5.00 plus 70p postage

[_] Advanced Z80 MC Programming - £5.95 plus £1.00 postage

I enclose cheque/money order/cold hard cash for £ ________

Name ________

Address ________

____

YC11

ADVENTURE BUILDING

down in your own games, but unravelling someone else's code is a difficult enough task at the best of times without my making it any more difficult for you.

Line 2050 is a little reminder of what we're doing, which you would remove from the finished game for reasons of memory if you were getting a bit close to the limit (as I usually do).

Line 2052 then checks to see if the player has entered the noun 'box' as part of his input. If he has, trundle off to line 2070 to take care of that. Otherwise, we've got doors and everything else to consider, so line 2053 ensures we are in one of the locations with doors. If we're not, then there is nothing to open, so tell the player this and send him back to line 10 for another 'what now' prompt. The last bit of checking to eliminate all silly inputs from the player is line 2054, which insists that the player tries to open a door and nothing else (opening boxes is being taken care of by a separate part of this routine, remember). Trying to open his head, for example, would just bring up a response "You can't do that" and send program execution off to line 10 again.

Now we are in a position of knowing that the player is in a location with a door and that he's trying to open it.

Variables

I've used the variables d1 through d5 to keep a check on each of the doors, the variable being set to a 1 if the door is open and 0 if it's closed. Thus the next four lines, lines 2055 to 2058, see whether or not the doors in locations 5 and 48 are open or not, and adjust the situation accordingly. Now our movement routine can be amended to include things like:

IF cp=5 AND no=6 AND d1=0 THEN PRINT "You can't go that way, the door's shut":GOTO 10

or something like that.

Line 2059 checks for the presence of a link word if the player is trying to open one of the coloured doors. If he is, and he's attempting to open the green door when in fact he's standing in front of the yellow one, then line 2060 sorts him out. To be nice to the player, the routine was written so that a particular door doesn't have to be specified. A simple **OPEN DOOR** will do.

Assuming we're standing in the right place, line 2061 then sees whether or not the door in question is open, repeating the earlier check on our two normal doors and telling the player that, if the door is open and he's trying to open it, he's wasting his time.

We know that the player is trying to open the correct door, that it isn't already open, so we can see if he's got the right key for the job. Yellow key for a yellow door, blue key for a blue door, and line 2062 sorts all that out for us in one swell foop, or even fell swoop. Knowing that having passed this line everything is okay, lines 2063 to 2065 set the relevant door flag, line 2066 being a little comment on my part because program execution never gets here. Lines 2068 and 2069 are used for the messages about doors which require locks and doors which need opening.

Despite there being five doors and only two boxes, the boxes require (in their expanded form) almost as much code, because apart from being inside one another initially they can also be used to hold things.

Boxes

Presumably, when opening a box, a player would be gifted enough to see whether or not there was something in it. This routine accounts for that, as well as prompting the player either to **EXAMINE** or **SEARCH** the box if specific information is required about exactly what is found.

Line 2070 checks to see if the player is trying to open the smaller box, in which case he should either be carrying it or it is in the larger one. If this is the case, we go to line 2081. If neither of those latter two conditions is fulfilled then line 2072 tells the player that the smaller box is not in his possession and goes to line 10 to make him try again. Lines 2074 to 2080 are thus concerned with large boxes only, and line 2074 checks to see whether the player is carrying it or not, objects having a value of −1 if they are in the player's possession.

If the variable o1 is set, then the box is already open. Line 2076 deals with this. The next line, line 2078, concerns itself with whether or not this is the first time the player has tried to, in the words of the immortal quiz game, open the box. If it is, that line tells him that he's found a smaller box inside it, updates the 'box opening' variable (the unfortunately named bo), updates the 'box opened' variable o1, and brings the smaller box into existence by giving it a value of −2, thus indicating that it is inside the other box and not actually in the player's immediate possession.

Otherwise line 2080 updates the ordinary variables, sets the variable bt to −2 (we'll see why in a moment) and trundles off to line 2085 to tell the player if there's anything of interest in the box or not.

Lines 2081 and 2084 are for the smaller box and follow a similar set of instructions to those for the larger one, the only difference being that we are not going about finding ever-smaller boxes. I toyed with the idea, I really did, but decided in the end that it was taking things a little bit too far. Two boxes will do.

Close

First of all, line 2081 tells us that if the smaller box is in the larger one (ob%(2)= −2) and the larger box is not in the player's possession (ob%(1)<>−1), then there is no way that the player can open it, so go to line 2074 and print out a suitable message. The variable o2 is used to look after this diminutive box and line 2082 sees whether or not it is already open. Line 2083 makes use of a line from the 'close' routine, because if the smaller box is in the larger one and the larger one is closed, the player can't open the one without first of all opening the other. Line 2146 contains a suitable message to cover that situation. Line 2084 updates the variable which handles the smaller box being opened, before setting the mysterious bt to be equal to −3.

The variable bt, then. If we're opening the smaller box, it is set to equal −3, but if we're opening the larger one it is set to equal −2. This is because objects have various values associated with them. Zero if they don't exist, a location number if that's where they happen to be found, −1 if the player's carrying them, −2 if they're in the large box, and −3 if they're in the small box. Thus in order to be able to use the one routine to tell the player whether or not he's found something of interest in a box, we set bt to be equal to the appropriate value and then use lines 2085 to 2088 for both boxes.

Objects found

Following on from all that, line 2085 sets the 'objects found' variable 'of' to equal zero (we haven't found anything yet) and then checks every object to see if it carries the value bt, or, in other words, is it in whatever box we happen to be looking at at the time. −2 for the large one, −3 for the small one.

If something is found, the variable 'of' is updated and the check continues in line 2086. If at the end of all this nothing has been found, line 2086 informs the player of this lamentable fact, but if something has cropped up, line 2088 tells the player that something is there and if he has an atom of sense he will then examine or search the box in order to find out what it is.

Needless to say we can only find things when opening boxes, not closing them, and this is just one of the differences between this routine and the next one. Remember you'll have to be very careful with things like 'put (object) in box' or 'place (object) in box' and make sure that the object goes in the right one and has the right value associated with it. Now, let's close a few things.

By now you should be getting familiar with the way that the system works, and so we won't be looking at every single line in the routine. As before, line 2102 checks to see if we're opening a box or a door. If it is a box, program execution continues at line 2132. After eliminating the impossible, the next set of lines (lines 2105 to 2132) perform the reverse of the open routine and ensure that the player is trying to close the right door in the right location, not bothering himself with attempting to close doors already closed. The coloured doors in locations 52, 53 and 54 snap shut and lock themselves when closed, as seen by the statement in line 2130, so we don't need our check for keys as we did with the open routine.

Checks

Boxes are handled by lines 2132 to 2148 and follow much the same lines as before. Remember, we have to make careful checks to see that items are in the player's possession, that he isn't closing something already shut and, most importantly, that he can't close the smaller box if the larger one is already closed with the smaller one inside it. Line 2146 is used for this, and by careful wording of the statement we were also able to use this in the open routine. The same statement applies to both circumstances, with the smaller box being placed out of reach by being shut inside the larger one.

Careful examination of your code before you commit it to the game will save an awful lot of work on your part later on when it comes to checking.

I'll leave you to add a few more words to your vocabulary list, and make some tentative steps towards putting in the relevant code and we'll finish for this month with the very thing that I just mentioned: checking the game and the sort of errors which crop up all too frequently.

The earlier-mentioned adventure, *The Odyssey*, saw more than its fair share of problems and errors, one of them concerned our old text compression friend, Mr. Snocken! In that game I came up with a very specific routine which would only work on that particular program. It replaced commonly occuring words or groups of letters in the game with symbols, so that 'ard' became **CHR$(133)**, 'from' became **CHR$(134)** and so on all the way through the next 100-odd character strings. On a machine with a lot of spare character strings doing nothing, this method is actually quite reasonable.

Fortunately for me, my brother Mike was checking the adventure. Now text compression is all very well, but it is meant to work properly. He had been most bemused at one point in the game when, somewhere near the king's palace, he had been surrounded by several large gufroms. I'm sure a gufrom is a wonderful thing, and one day I'll probably write an adventure all about them, but getting 'ard' and 'from' mixed up is the sort of thing that you don't want to see in your finished adventures.

Another mistake from the same game. A great part of the adventure writer's art is concerned with flaps, setting them when various events occur and re-setting them when something else happens. At a particular part of the game you had to escape from the Cyclops' cave, and this involved, amongst other things, blinding the Cyclops and escaping amongst a herd of sheep. The blind giant could only feel the woolly backs of the sheep and thus you could get away. Quite where you were supposed to hide I'm not sure, but still, that was the solution.

Alas, whatever you did then, you could not escape from those sheep. I had remembered to set a flag to indicate the presence of the blessed things, but then whether you dropped them, told them to go away, jumped over a cliff in despair, or what, they were still there gambolling serenely alongside you, no doubt still grazing contentedly on the grass aboard ship as you set sail for parts unknown. Take great care of your flags.

Crew

One last tale from *The Odyssey*. In order to complete part one of the adventure you had to have with you a certain number of men to act as your crew. You also had to eat sufficient food for you to have the strength to finish the game. The food was no great problem, since kebab shops appeared to abound in Homer's day, but the men were a tricky bunch. At various stages of the game you could either recruit men or lose them to Lotus Eaters and fearsome monsters like Scylla and Charbydis. By some strange programming quirk, an early version of the game made it possible to get all the way through to the end with minus three men on board your ship. When testing your game, make sure you check every possible occurence of things happening. In this case, I had neglected one possible route that people might take (I never thought anyone would, but adventure players, like writers, do try the most impossible things) and on that route they could lose three men I hadn't accounted for.

A great temptation occurred when I was doing a spoof version of *Colossal Cave*, called (with great originality) *Enormous Cave*. In the original, you may remember that by watering the little plant twice you made it grow explosively until it filled the pit you were standing in, whereupon you could then climb the plant and explore a whole new world. Water it a third time and it wilted away and died, thus cutting off that new world. I thought that in my version it it would be a good idea to have the plant continue to grow every time that you watered it, making it into an immense monster of a plant if the player had enough time and patience. I didn't expect one game tester to have the patience of Boycott carving out a century and water the thing so much that it filled the computer and made the game run out of memory. Curb your enthusiasm for problems of this nature.

Problems

I usually present my problems in such a way that a player can solve, say, two or three in any old order but, generally, will have to go through in the kind of order that I want him to. In other words, perhaps problem 8 can only be solved after problem 5, problem 11 only after problem 8, but the intervening ones can be dealt with as the player sees fit. Naturally enough this means that I have to be very careful about where all my game objects are placed, because if the item required to solve problem 8 could only be found after solving problem 11 then this would, of course, render the game impossible. I'm sure many adventures fall down at this stage, making an awful lot of unnecessary work for the programmer, and it can all easily be avoided with the aid of a decent map drawn on a large scale. The original map for *Enormous Cave*, for instance, was a very small one, but in order to write the game and fit everything in correctly so that it could be solved I ended up with something which could have given the Bayeaux Tapestry a run for its money. One day of drawing a detailed, large-scale map will save you a week of programming headaches when you can't get the thing to work properly.

Oh well, out of space as usual, so carry on adding those verbs and remember to check everything very, very carefully; big brother might be reviewing your games! Bye for now.

CLASSIFIED & MICROMART

CLASSIFIED & MICROMART

ASTROLOGY for beginners only £11.50

A Starter Pack comprising a simple program to calculate a horoscope, an introductory booklet & 2 self-teaching programs (how to interpret the horoscope).

No previous knowledge required

Spectrum, BBC/Electron, Oric, Dragon, Tandy/Genie, Commodore 64/PET, Atari, Sharp, Amstrad/Schneider, Colour Genie, MSX, IBM, Apricot, etc.

many more programs for experienced astrologers also other micros

Cash with order (add 50p outside UK) or large sae for free catalogue to: –

ASTROLCALC (Dept YC)
67 Peascroft Road,
Hemel Hempstead, Herts HP3 8ER
Tel: 0442 51809 537

AMIGA, ORICS, AMSTRAD CPC PCW

Software for sale or hire
Super Selection of Software now available
AMSTRAD – Free Membership

For details, send S.A.E. (stating computer) to:

THE SOFTWARE CLUB
26 Beechley Drive, Cardiff CF5 3SN

Spectrum Repairs

£14.90 inclusive of labour, parts + p&p. Fast reliable service by qualified engineers. Average repair 24 hrs. 3 mths guarantee. For help or advice ring:

HS Computer Services
2 The Orchard, Warton
Preston, Lancs. PR4 1BE
Tel: 0772 632686 327

SIRIUS

EXPANSION PRODUCTS
ISSUE 18 NORFOLK ROAD
BRIGHTON BN1 3AA
(0273) 736880

COMPUTER SERVICING

FAST REPAIR SERVICE FOR:

- Amstrad range (Approved Service Centre)
- Spectrum, ZX81, Interface 1, Microdrive & QL (Approved Service Centre)
- Commodore Range • BBC and Electron
- Disk drives, Printers, Monitors

All units repaired to original standard by fully qualified staff. All repairs established International Service

WE STOCK SPARES FOR ALL COMPUTERS

Mail orders and phone orders, Access and Visa accepted.
Personal callers always welcome – On the premises repairs – Quick Turnaround
STOP PRESS – CBM64 PSU £16.95 inc VAT

QUANTUM ELECTRONIC SERVICES
33 CITY ARCADE, COVENTRY CV1 3HX
TELEPHONE: (0203) 24632

USED HARDWARE

Spectrum 48K	£40.00
Spectrum Plus	£59.00
Spectrum 128	£89.00
Spectrum +2	£109.00
Commodore 64 (inc. rec.)	£115.00

Others – Please Phone

Printers – Please Phone

All hardware is complete, in excellent condition and guaranteed for 3 months. Price includes delivery.

Send cheque/PO to:

SOFTWARE CITY
173 Mansfield Road,
Nottingham NG1 3FR
Telephone: (0602) 410493

ATARI ST USERS – TALK TO US!

- ENORMOUS P.D. LIBRARY
- CHEAP BLANK DISCS
- LASER PRINTING SERVICE *(in colours)*
- BOOKS

Send for a catalog and discount voucher to

WICCA-SOFT
P.O. Box 54, Macclesfield SK10 5EH

ARE YOU BUYING or selling a home computer? **Exchange & Mart** have over 440 thousand weekly readers who do just that – to advertise in **our** up to date **Micromart** classified section ring **Bolton (0204) 399000** and find out just how turned on we really are.

SCHOOL SOFTWARE LTD.



FREE Catalogue Amstrad CPC, PCW PC1512, Commodore, BBC, IBM PC
Amstrad PCW – Business Software, School Admin. PC. 24 Hr. Visa/Access Hotline. Ring UK 010353 – 6149477 (Office Hours) (Irl. 061-27994) 010 353-6145399 (UK 24 Hr.)

MAXI-MATHS
Amstrad PC, IBM PC, Amstrad 464,664,6128.
1. Triangles, 2. Angles, 3. Sin Cos Tan, 4. Rectangles, 5. Circles.
A highly interactive program such as Basic Geometry provides a very stimulating learning environment.

MAGIC MATHS (age 4–8)
CBM 64, All Amstrads, IBM PC
Addition and Subtraction. "A serious challenger to similar BBC programs and a good example of its type". Primary Teaching and Micros UK.

MATHS MANIA (age 8–12)
All Amstrads/CBM 64/IBM PC
Multiplication and Division. "It appeals to the age group. My son has been sneaking downstairs before breakfast to play".
BBC CEEFAX review.

BETTER SPELLING (age 8–adult)
All Amstrads/CBM 64/BBC/IBM PC
"Well Organised Lessons. Educationally it is very strong" 8000 Plus.

BETTER MATHS (age 12–16)
All Amstrads/CBM 64/IBM PC
Rated in the top five in Amstrad Action educational survey.

CHEMISTRY (age 12–16)
All Amstrads/CBM 64/BBC/IBM PC
"Very ambitious in terms of the range of topics. High standard of questions." 8000 Plus.

BIOLOGY (age 12–16)
All Amstrads/CBM 64/BBC/IBM PC
"A good excuse to play with your computer and have fun while revising". Your Computer.

Mapwork Quiz (9–Adult) CPC, BBC,CBM 64
Playschool (3–7) CPC
Geography (12–17) CPC
Physics (12–16)CPC/PCW
School Administration PC1512/IBM

DISCS: £14.95 CASSETTES: £9.95
Direct MAIL ORDER 48 Hour Despatch.
Send Cheque Visa/Access/ and Exp. Date
(£1.00 P&P) PC Versions Check Availability.

VISA

Meadowvale Estate, Raheen, Limerick, Ireland.
Tel: (UK) 010-353-61 49477 (IRL. 061-27994)

Terrific Utilities for Spectrum and Amstrad BRADWAY SOFTWARE

For the Amstrads:

LETTA-HEAD PLUS (PCW8256, 8512) **£17.50**
Create business & personal stationery, letterheads, labels, posters, etc. using graphics and 25 different character fonts. Select the required format & print all the copies you need!

LsPrint (PCW8256, 8512) **£19.50**
Print LocoScript 1 documents on any daisywheel, maintaining ALL LocoScript features. More powerful than LocoScript 2.

WordFinder (PCW8256, 8/9512 CPC6128 PC1512 BBC) **£12.50**
At last – rescue for the crossword & word game enthusiast! Instant access to 24000 unique words (not derivatives), names & anagrams.

For Spectrum 48, Plus, 128, +2:

Letta head Plus	**WordFinder**
Dumpy 3	**Lin-O-Type**
Astrum+ assembler	**Discovery Disc Manager**

For further details please see our ads in other issues, or send for a full catalogue. To order, please add 50p UK, Europe, £2.00 worldwide airmail P&P per program.

Bradway Software (YC) 33 Conalan Avenue, Sheffield, S17 4PG

CPC6128 22 games £50 ono. Tape-rec £15 ono. Lightpen £20 ono. Laser-Basic + Pascal + Toolkit util £50 ono. Two books £15 ono. Mr. Hussey, 120 Goodshaw Avenue North, Loveclough, Rawtenstall, Lancs. BB4 8RH.

AMIGA Freaks!!! Send list or programs to Morten Petersen Stejlbjergves 3,1 6000 Kolding Denmark or call 05504437 after 6pm.

AMSTRAD 464 system for sale. Disk drives, mouse, Rampack, software, books. Value £900. Yours for £475. Phone Reading 61314.

TOP quality unbranded SS/DD 3.5in. disks, cheap, only £1 each plus p&p. Phone Don on 01-685 1310.

SPECTRUM 48K with joystick and interface. Some games, £40. Opus Discovery, one disk drive with 10 diskettes £60. 0925 811548.

COMMODORE 64, two datasettes, Currah Speech, light pen, over £500 worth of software, many extras, £275. Tel: Greenock (0475) 28957.

ATARI original ST, games for sale all "originals" Starglider, Starraiders, Deepspace, Gauntlet and several more. Also Modem wanted. Tel: 0904 791067.

CROSSWORD Companion. Commodore 64 disk program plus 18600w vocabulary. £10. Cheques, POs to John Tulley, 71 Town Lane, Mobberley, Cheshire WA16 7HH.

AMIGA, Macintosh and Atari ST penpals wanted to exchange software etc. Phone 05827 69152.

JUPITER Ace resource centre keeping the 'Ace' alive by distributing user domain hardware project and software. For details contact: Ian Jopnes, 21 Dene Street, Pallion, Sunderland, Tyne & Wear SR4 6JB Tel: 091 5652833.

ATARI 600XL. Datacorder, software, books, Mags. £28. 130XE M/Code book. £4. Atari cassettes. 50p-£2. Write: 67 St. Johns Walk, St. Ives, Cornwall.

SPECTRUM Plus computer. Boxed, as new with 16 inch colour television. Only £100. Phone (05827) 69152.

APPLE Macintosh Plus with Apple 20 meg hard disk drive (both in pladnum). Lots of software. Only £2300. Phone 05872 69152.

QL Peripherals. Colour monitor, 3.5in. drive and interface, Expanderam 512K £350 the lot. No split. Phone Witham (Essex) 0376 517347.

PSION Organiser RS232 comms link Epson compatible and word processing program pack. New, boxed £65 or Atari STFM software, hardware. Tel: 0408 21870.

COMMODORE 64, datasette, 1520 colour printer/plotter, joysticks, 30+ games, books and magazines, utilities, 20+ blank tapes. £220 ono. Tel: 0905 58601 evenings.

PC (1512) software, "Moneywise" £60; "Quick Start" database £30; Electric studio light pen £10. Sally, 124 Dovedale Avenue, Long Eaton, Nottingham.

FLOPPY disks. Brand new, surplus to requirements. £4.50 box of 10. Phone Graham after 6pm on 01-949 7347.

AMIGA A2000 with 1081 HRM multi-tasking. Includes: 1MB RAM, 256KB ROM. Unused. £1250 ono. Tel: 0249 712247 (eves); 0249 650060 (day).

CBM 128 + 1541 drive. Freeze frame. Top software worth £500. Will sell for £300 ono, will split. Details 04574 2750.

INFOCOM disk originals, half price or swap similar including Spellbreaker, Planetfall, Stationfall, Infedel, Hollywood Hijinks. Want Lurking Horror. 01-449 6232 evenings.

ALPHACOM 32 printer for sale in good condition. Only £20. Must sell. Ring Colin 0633 842750.

AMIGA hardware!! to increase your equipment with disk drives, video digitisers, RAM expansions and sound samplers contact: Roger Zens, Hunsdorferweg 21, 4224 Hünxe 2, W. Germany. Tel: (FRG-28586422).

ELECTRON, tape recorder, leads, joystick, software, books. Excellent condition £75. Tel: 01-747 3202.

ORIC printers and software for sale. SAE for list. Contact: Robert, 1 Croft Lane, Diss, Norfolk IP22 3NA.

128K ZX Spectrum plus power pack, switchable i/face, Epson P40 printer (no leads), 10 games £220. Phone 0475 673879 evenings.

ORIC 1 48K, new leads. Software, recorder, ect. £45. P. Ogden, 49 Camberley Road, Knowle West, Bristol BS4 1SY. Tel: 631778.